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LARYNGISMUS STRIDULUS IN THE HORSE.

BY GEORGE FLEMING, F.R.C.V.S., 2ND LIFE GUARDS.

I HAVE searched in vain through veterinary journals and works on pathology, for mention of Spasm of the Glottis as a neurosis of the larynx, uncomplicated by disease in that organ or its vicinity. The neuroses of the larynx of the horse have either to a great extent escaped observation, have not been studied, or they are very few. Deranged sensibility is only remarked when there is highly exalted excitability of its sensory nerves, giving rise to severe coughing fits; but this hyperæsthesia is rarely, if ever, observed as an independent disease; while anæsthesia, or abnormally diminished sensibility of this important part, has never, to my knowledge, been noted apart from other morbid conditions. Even the neuroses of the motor function of the larynx are but little known. Acinesis, or Palsy, is that which is most familiar to us, in the diseased condition termed "roaring"; in which we have unilateral paralysis, and subsequent fatty degeneration of the crico-arytenoid muscles—due in many cases, if not in all, to disturbance in nutrition of the recurrent laryngeal branch of the par vagum. Paralytic dysphonia is only remarked, so far as my experience goes, in the dog.

Hypercinesis, or spasm of the laryngeal muscles, has not, according to my researches in veterinary literature, been recorded as occurring independent of other morbid conditions; though it has been often described as attacking mankind, and has received the designations of "Laryngismus Stridulus," "Spasmus Glottidis," "Asthma Laryngeum," "Asthma Acutum Millari," "Asthma Thymicum," etc. In the human species spasm of the glottis is said to occur almost exclusively during childhood, and especially in the first year of life—being most frequent during the period of the first dentition; it seems to be more common among artificially reared city children, than among those brought up in the country who receive the breast. Among adults, it is only exceptionally witnessed, and always in those who are hysterical.

The term Laryngeal Asthma, or that which I have given at the head of this paper, can only be applied to contraction of the muscles of the glottis, in which all are more or less uniformly and simultaneously shortened, so that the vocal chords are tightly stretched and the glottis is closed. This muscular contraction may certainly occur from reflex action during inflammatory disease of the laryngeal mucous membrane; but then it is merely a concomitant disorder, and cannot receive the appellations we have given it when it is uncomplicated with other derangements or alterations.

The silence of veterinary writers with regard to the occurrence of Laryngeal Asthma or Laryngismus Stridulus in animals, induces me to publish—even at this late period—the only case I have witnessed in more than twenty-three years' practice. Some time ago, I casually brought it under the notice of the Fellows of the Central Veterinary Medical Society, with a view to elicit opinions as to the rarity, or otherwise, of the affection; but the allusion to it was necessarily brief, and given without notes. No other instances having been reported, and, as I have said, no reference to the disease being found in periodical or book literature, I venture to lay my experience of it before the profession in the following history transcribed from my notes and regimental case-book. The case occurred at the manœuvres at Cannock Chase, Staffordshire, in 1873.

August 31st.—Subject: Troop mare, A 47, six years old, belonging to the Royal Engineer Pontoon Train. Colour, dark chesnut: temperament, nervous; configuration, slight, with light loins, thin neck, and rather large head. Evidently a foreign-bred animal. For several days previous to this date has been standing, with the other horses, on the picket line in camp, the weather being very cold for the season of the year, and the rain falling heavily and continuously, while the animals had neither blankets nor shelter. The officers' and men's tents were close to the picket lines. About 2 a.m., on the above day, I was awoke by a loud bellowing noise, as if of a cow, which soon became changed into a stertorous roar not unlike the braying of an ass. The night was very dark; and fearing that some straggling animal had wandered into our lines, and might produce disturbance among the horses, I got out of bed and called to the guard for an explanation of the noise. He reported that a horse was coughing; but as the sounds were becoming more acute and strange, I apprehended something seriously amiss, and dressing hastily, quickly found myself on the spot whence the noise proceeded. I then discovered that the before-described mare was choking, and that complete asphyxia appeared to be imminent. She was staggering as if intoxicated; the body was covered with a cold perspiration; the nostrils were dilated to the utmost; the eyes looked as if starting from their orbits; the mouth was wide open, and the tongue hung flaccid from it and was cold and clammy. From the hurried inspection I made in the dark, the mare seemed to be in the agony of impending suffocation, the noise made during her attempts to inspire being now almost as shrill as a scream. Considering there was not a moment to lose if the animal's life was to be saved, and surmising that the dyspnœa was due to some obstruction in the larynx, I ordered the sentry to procure a light from the guard-tent, while I ran for a knife. There was no time to grope in the darkness for my instrument case, so procuring a large penknife, I hastened back to my patient. I found her lying on the ground apparently dead; so at once plunging the strong blade of the knife into the front part of the neck, some inches below the larynx, I cut down upon the trachea

and made a longitudinal slit in it two or three inches in length. Respiration, which seemingly had all but ceased, at once commenced through this opening, the sides of which I kept wide apart by two fingers; and in a few minutes the mare arose, was led to her place on the picket line, and immediately began to eat hay as if there had been nothing the matter with her. I examined the back part of her throat as well as I could under the circumstances, as I fancied the impediment to respiration might have been a twig of heather lodging in or about the larynx—the horses eating large quantities of this vegetation, which grew thickly on the camping-ground; but I could not discover anything of this kind. The incision in the trachea was kept open by two pieces of tape passed through each side and tied over the neck.

Next morning the mare was quite lively and feeding well. A careful examination was again made of the pharynx and about the epiglottis, while the interior of the trachea and larynx was explored by means of a large probe; but no foreign substances could be detected. Respiration was still maintained through the wound until the forenoon, when, the opening having been temporarily closed, breathing took place by the nostrils without any noise being heard or the mare exhibiting any symptom of distress. The opening in the neck was finally closed by pin suture, and the mare went to exercise during the day, and moved about as if quite well. It was supposed that the attack of asphyxia had been caused either by a piece of heather becoming fixed about the larynx, or that a wasp had stung the mare's throat: these insects were swarming in the camp. There was no external swelling about the upper part of the neck or windpipe.

Next morning, there had been no recurrence of the alarming symptoms. In the forenoon the camp was moved to Milford, about six miles distant, and the mare was led along the road with the other troops. About half way, she was all at once seized with the laryngeal spasm, bellowed in the same braying and stridulous manner, and presented all the distressing phenomena of the first attack. She reeled about the road; and this being very narrow, the march of the troops behind her was

checked. Just as I arrived the animal was about to fall, choked. The sutures in the neck were instantly divided, the wound torn open by the finger, and the aperture in the trachea dilated. This gave immediate relief. On arrival at the new camping-ground, a good tracheotomy tube was made from the spout of an old metal teapot. The parotid and submaxillary regions were blistered. The mare looked in excellent health and condition.

On September 2nd the tube was removed, as nothing had happened to cause alarm; respiration was carried on in a perfectly normal manner when it was taken out, and it was decided to allow the wound to close spontaneously.

On the 3rd, the opening in the neck was nearly obliterated by granulations, but while standing quietly at the picket line a slight recurrence of the noise and distress was observed; this necessitated re-opening of the wound, though the tube was not again inserted, so that the mare breathed through the aperture as well as by the nostrils. Up to September 9th there were no more attacks. On the forenoon of that day, however, while being shod, the same urgent symptoms of dyspnœa suddenly appeared; and being within call, I was compelled to once more cut open the wound in the neck, which had nearly healed. Every day between this date and the 3rd the mare had been regularly exercised without exhibiting the slightest indication of distress. A strong blister of hydrarg. biniod. was applied around the larynx. On the 12th, the troop to which the mare belonged marched from Cannock Chase for Aldershot, halting at Wednesbury. The animal was, as usual, in excellent hard condition. On the 14th, on marching through Birmingham towards Henley-in-Arden, she had another attack of laryngeal spasm, but was at once relieved by her rider breaking up the granulations in the wound and pushing his fingers into the tracheal opening. Before arrival at Aldershot, on September 20th, I was informed that the mare had two or three more seizures, but the soldier in charge of her, by clearing out and dilating the neck wound, prevented serious consequences. At Aldershot the wound was allowed to cicatrise, and up to the 30th of September the mare remained free from these alarming attacks. Having passed

from my care, I heard nothing further of her, but I believe she was cast and sold soon after.

I think, from the clinical history of this case, there can scarcely be a doubt that it was really one of Spasmus Glottidis. There was no disease to be detected in or about the larynx; no cough was present at any time, either during the paroxysm or in the intervals; nor could anything of an abnormal character be perceived in the respiratory function, except during the dyspnœa. The irregular intervals at which the attacks occurred, their onset even when the animal was at rest, the absence of cough, as well as noise during ordinary respiration, were peculiarities in the case which precluded the notion that the spasm was due to disease of the larynx or the presence of foreign matters. And if we compare the symptoms in this case with those recorded as occurring in man in this condition, we shall find a close resemblance. In him the course of the malady is an interrupted one, marked by paroxysms and intervals of exemption. A sudden violent interruption of the respiration, which may last for several minutes, is pathognomonic of the seizure. "By-and-by," says Niemeyer, "the air again begins to penetrate into or out from the glottis, which at first is completely closed, and still remains contracted. In addition to this, the attack is accompanied by the often-mentioned prolonged whistling, inspiratory noise, the fear, the restlessness, the livid countenance, the strenuous contraction of the inspiratory muscles, and the position upright or bent forwards. After a few minutes, as soon as the child has forgotten his fright, he is completely restored. There is no cough in Laryngeal Asthma, as the laryngeal mucous membrane and the vocal chords are healthy; nor, as the vocal chords are neither relaxed nor thickened, is there any hoarseness. . . . The paroxysms thus described take place at varying intervals; a week or more may pass without their repetition. In bad cases the fits multiply, and follow one another more closely, and it is these cases that are most apt to be accompanied by general convulsions. There always remains a great tendency to relapse, which is still to be feared, even though a child may have remained for months without a paroxysm. Finally, instances have no doubt been observed

in which Laryngeal Asthma has shown itself but once, never again to recur. In rare instances a paroxysm terminates in suffocation, the closure of the glottis, and consequent privation of oxygen, outlasting the endurance of the organism."

In the mare, there is every reason to believe that death from suffocation must have taken place in the first attack, had not tracheotomy been performed just in time, as breathing had all but ceased when the trachea was opened. The subsequent attacks were not so severe, as the tracheal wound was always promptly re-opened whenever the breathing became stridulous and the animal distressed; but I think it is not improbable that, had relief not been afforded in this way, a fatal termination would have been the result in any of the seizures, which were always remarkably sudden and severe.

Of course the cause could not be ascertained; and beyond the exposure to cold rain for several days and nights, while standing tied to the picket line, there was no other reason for this very unusual manifestation. In man the pathogeny of the disease is obscure. It seems rather to be an independent affection of the par vagum, or of its recurrent branch, owing perhaps either to pressure along some part of the course of one of these nerves, or to centric irritation at the root of the vagus. It has also been regarded as perhaps due to a reflex phenomenon arising from excitement of some other nervous trunk.

LARGE MORBID GROWTH ATTACHED TO THE COLON IN A YEARLING FILLY.

BY J. WOODROFFE HILL, F.R.C.V.S., WOLVERHAMPTON.

THE tumour sent per train on May 11th was removed from a yearling filly after death. The following are the particulars of the case. The animal, which was out at grass, was observed to be ill on May 9th, but nothing in the way of treatment was adopted, beyond taking her up; and we were requested to attend on the 10th. Mr. Moreton, a pupil, visited her in the morning, and administered a sedative draught, with linseed oil.

In the afternoon I saw her myself. The patient was then presenting symptoms of Colic, with intestinal obstruction; and from time to time she stretched out at full length, as if to urinate, and looked back at her flank. The pulse was weak, but not high; breathing very little disturbed; mucous membranes slightly injected. I left antispasmodic medicine to be given at intervals, with linseed oil, and had the abdomen stimulated with embrocation. Death took place at 2 a.m.

On making a *post-mortem* examination, I found no inflammation throughout the intestinal tract, except immediately anterior to the tumour, at which part there was considerable submucous hæmorrhage and a block of ingesta. Beyond one section, I have preserved the tumour in its entirety for your more thorough examination. It was firmly attached to the intestine, and you will observe, so far as I divided it, that it is of a dense cartilaginous consistency. The division exhibited sacs, having within them large blood-clots—some recent, others organised; and from one there flowed a quantity of dark pus. Previous to my dividing and washing it, the tumour weighed 10¾ lbs.

Some portions of the mass appeared to me to resemble cancer, particularly where the smaller cells or nuclei were located. I may observe, however, that my examination was very brief, owing to my desire (Sunday intervening) to send you the specimen by the midday train.

The stomach contained a large congregation of bots, beyond which nothing further abnormal was to be noticed.

[Professor Duguid, who kindly examined the tumour forwarded by Mr. Hill, reports: "I find that the tumour sent by Mr. Hill is malignant. It is situated in the lymphatic glands of the colon, at the junction of the small intestine with the large. The mass, including the small portion of intestine, weighed nearly nine pounds. In several places not only had hæmorrhage taken place, giving rise to fibrinous clots, but in some parts pus had formed in the centre of the mass. I am inclined to think this must be a secondary growth; it is seldom we find these as primary tumours in such a situation."]

ENCEPHALOID CANCER IN A COW'S KIDNEY.

BY PROFESSOR WALLEY, ROYAL VETERINARY COLLEGE, EDINBURGH.

SUBJECT, a five-years-old cow; history unknown; sent into Leith abattoir for slaughter; said to be affected with Pleuro-pneumonia Zymotica. Mr. Reid, V.S., inspector, called my attention to the kidney after its removal from the body; also informing me that numerous growths were found on the omentum of a somewhat similar character, but harder. A quantity of fluid was also found in the peritoneal cavity. The kidney, with its surroundings, at first sight had the appearance of a ragged encysted Pleuro-pneumonia lung; a small portion of its inferior surface was visible, the remainder being covered by an immense quantity of adventitious matter, which resembled somewhat a mass of organised lymph. The whole mass weighed about 24 lbs. On making a longitudinal section through it, the kidney was discovered embedded in the new growth, the organ itself being about six times its normal size, and separable by the finger from the capsule, which was extremely thickened and intimately connected with the surrounding material. The external surface of the kidney had preserved its lobulated character; internally it was considerably altered, the inter-pyramidal connective tissue and the pyramids themselves being largely invaded with the encephaloid matter. Some of the pyramids were entirely destroyed; in others about $\frac{1}{8}$th to $\frac{1}{2}$ an inch of the base was left; only one apex could be discovered. The cortical portion was not so much removed or invaded—here and there being very thin, but on the whole about $\frac{1}{2}$ to $\frac{3}{4}$ of an inch thick. In a few spots invasion could be seen extending in it and through it, so as to be visible on its internal surface. The posterior third of the kidney was entirely destroyed—being replaced by masses of encephaloid varying in size from a walnut to, in one instance, a large orange. The largest mass had undergone softening—fatty degeneration—and was bestudded with small cysts containing creamy matter; in some instances sanious, urinous in others. When the contents of the cysts were pressed out, an alveolar stroma was left. The colour varied

considerably: in the more recently invaded portions there was much vascularity, and hence a variegated appearance; in the advanced portions, the colour was of a dirty grey, and here and a yellowish-grey colour. Several cysts were found in the interior of the kidney, containing a dark sanious-coloured fluid. Another large cyst containing the same kind of fluid was discovered between the lobules externally, and a still larger one in the same position containing a yellow transparent fluid—the cyst and the fluid closely resembling a hydatid cyst and contents; but on collecting some in a glass for microscopic examination, and allowing it to stand for a few hours, a distinctly urinous odour was evolved, and several crystals of oxalate of lime, with a few cancer cells, were detected by the aid of the microscope.

The adventitious mass surrounding the organ was firmer in consistence—opaque, white, and exuded a large quantity of creamy fluid on section or on pressure with the back of the knife; it had bloodvessels scattered through it, and here and there isolated patches of a very vascular nature; its internal surface (moulded to the exterior of the kidney) was concave and smooth,—the external surface being lobulated and more vascular.

Under the microscope, numerous epithelial cells were seen, some containing nuclei and nucleoli. They were intermixed with lymph and red blood-corpuscles, and in the less advanced portions with small quantities of delicate fibrillated stroma. In every part, but more particularly in the degenerated portions, myriads of free nuclei were present, with molecular matter and broken-up cell-structures.

As I did not see the *post-mortem*, I can give no idea of the character of the omental new formations; but I have no doubt, from Mr. Reid's description, they were of a similar nature to the renal growth. Whether the latter was secondary or primary, I cannot pretend to say. I am inclined to think it was secondary. In the portion of the growth lying over the upper surface of the kidney, the posterior part of the left diaphragmatic crus was detected. It had lost nearly all the physical characters of healthy muscle—being soft, of a dirty brick-red colour, and rather glistening.

TORSION OF THE WOMB IN A MARE, ETC.

BY A. G. ROLLS, M.R.C.V.S., ARUNDEL, SUSSEX.

THE patient in the present case was a brown hack mare, fifteen hands high, and aged sixteen years. She had been in her owner's possession for some nine or ten years, and was in foal to a cart-horse. She had gone the usual period, when she was one morning found showing symptoms of pain. She had been turned out for some time in a large meadow, in company with two other mares.

On April 24th, 1869, my attendance was requested, and on seeing the animal it was evident that she was vainly endeavouring to foal. On examining her *per vaginam*, she strained so violently, and forced her distended bladder so tightly against my arm, that I thought it advisable to first empty that viscus; this I at once did. I re-passed my arm up the vaginal passage, when, to my great surprise, my hand was suddenly arrested before feeling the *os uteri*. Further examination proved to me that I had to deal with a case of torsion of the womb—the twist running from right to left, or from the off to the near side. I threw the mare, and attempted to reduce the twist by turning; but fell into the same error as Captain Russell, M.R.C.V.S., Grantham. I rolled the mare the reverse way; then on examination finding no difference, I turned her back again, but did not follow it up sufficiently,—the consequence being that, finding no relaxation, I gave up the case as hopeless, and requested the owner to allow me to attempt to save the foal by cæsarean section, to which he refused consent. The mare died in a few hours, and on *post-mortem* examination the womb was found twisted from right to left; the twist extended posteriorly to the *os uteri*, and seemed double—the finger having to be passed downwards, then upwards, and finally again downwards into the womb. My failure in this case considerably mortified me, and led to my re-examining the literature (Continental) on the subject, with the result of convincing me (aided by some mechanical experiments), that *the animal should be turned in the same direction as the twist.*

The opinion generally adopted at the celebrated discussion on the subject in 1860, by the members of the Société Centrale de Médecine Vétérinaire, was that turning should take a contrary direction to that of the twist.

I resolved to give a fair trial to my own idea of turning, if the opportunity offered; and I am pleased to say that in two or three cases (all I have met with) I have been successful in cows.

At the risk of being tedious, I will relate the last case I operated on.

April 26th, 1875.—An Alderney cow, up to her full time, was observed trying to calve; no water bladder appearing, the owner became alarmed, and telegraphed for assistance. On examination, I found a case of torsion of the womb, the twist in this case going also from right to left—*i.e.*, from the off towards the near side. I at once threw her with a cart-rope, tied her hind-legs tightly to her body, and four complete turns were given her in the same direction as the twist. I kept my hand up the vagina during the rolling, in order to note the effect on the womb. The twist being seemingly reduced, I allowed her to rise, when I found about one quarter of a twist remaining; she was therefore re-cast, and two additional turns given: this placed the parts in their normal position. Four hours subsequently the *os* was sufficiently dilated to enable me to ascertain the mode of presentation; and finding it natural, I gave directions for her to be allowed to calve spontaneously. Next day, at my visit, I found she had calved a dead calf. She needed no further treatment, and she has since been successfully calved down.

RINDERPEST IN TURKEY.— Letters from Constantinople state that the Rinderpest is rapidly carrying off the comparatively few head of cattle in Turkey which have escaped the ravages of war. Thousands of cattle are dying every week in the "vilayets" of Smyrna and Hudavendighiar; and unless the Government promptly adopt and put in force energetic and vigorous measures to prevent the further spread of the contagion, one of the richest sources of the wealth of Turkey will, it is added, infallibly be destroyed. Already meat is becoming scarce in the capital, and a great part of the meat which arrives consists of the flesh of animals which have died of the disease.—*Pall Mall Gazette.*

Editorial.

THE IMPORTANCE OF HISTORY IN VETERINARY SCIENCE.

CICERO has somewhere said, that "to be ignorant of what has occurred before our time is ever to remain in a state of childhood." If this assertion is to hold good for the ordinary, as well as the extraordinary events and occurrences which mark the progress of society in general, it can be no less true for those special departments of human knowledge, the advancement of which depends upon the accumulation, assorting, and utilising of facts acquired by the cultivated and sustained observation and research of many generations of investigators. Unless the students in these branches of science are acquainted with what has been done by previous workers in their own particular line, and are cognisant of at least some of the collateral circumstances which influenced the labours of these, it is evident that they cannot be in a position to obtain from their speciality all the benefits it might and would confer. Indeed, their position with regard to their science can scarcely be much more advanced than that of its early cultivators; for the experience of these must to a great extent, if not entirely, be lost upon them, and they will have to commence pretty nearly where these began, instead of where they left off.

In this country there is but little evidence that the history of veterinary medicine has been studied or utilized for the benefit of its students, or the promotion of the public welfare. We are not aware that the subject has ever been alluded to in our veterinary schools, and it is quite certain that it has never received systematic treatment at the hands of any teacher in them. We may even doubt whether many veterinarians are possessed of the most rudimentary notions with regard to the history of this most important and very interesting branch of science, or are even acquainted with the names of those early pioneers who toiled to place it on an equality with human medicine. It is perhaps but little known that among the Greeks and Romans the diseases of animals received nearly as much attention as those of mankind, and that from that early period up to the present time the history of animal medicine forms a most instructive and valuable chapter in the annals of human progress and enlightenment.

At a far distant date, looked upon as differing in no respect from human medicine; then subsequently ranked second to it; afterwards sharing with it serious vicissitudes and misfortunes during what are called the "Dark Ages"—when ignorance and superstition claimed them both for their own—though emerging more slowly than it into brighter days, when learning experienced that wonderful revival which has produced such astonishing results;—until now, it again lays claim to the position accorded it in ancient times; and while it receives benefits and assistance from the higher branch of medicine, it offers at least equivalent advantages.

In this long interval of time, the progress of veterinary medicine can be more or less clearly and continuously traced, but it is not until the eighteenth century is reached that its history begins to acquire that interest which becomes so great with the advent of the present century. Then this history assumes an importance which has, strange to say, been scarcely, if at all, recognised by those who have been placed at the head of the profession in England. Perhaps one reason for this neglect or omission is to be found in the absence of literary tastes, and another in the fact that this history is only to be read in foreign languages. It is also not improbable that, even had these reasons not existed, no advantage would have been discerned in such a study. That this surmise is not far from the truth, may be inferred from the circumstance that not long ago—during the last invasion of Cattle Plague—when we had occasion to lament the neglect of the study of epizoötic diseases, and to point out the enormous losses this country had sustained in consequence, our professional contemporary ventured to discredit our statement, and to confess itself unable to perceive any relation between this study and the prevention of such scourges.

But a very cursory review of what has occurred during the last half-century only, will suffice to convince even the most sceptical, we should imagine, of the grave disasters that must inevitably attend neglect of the teachings furnished in this direction by veterinary history, and forcibly remind us of the necessity that exists for making it a subject of study. Take, for instance, the history of the most virulent and destructive epizoötic diseases which have visited this country—Cattle Plague, Foot-and-mouth Disease, Contagious Pleuro-pneumonia, and Sheep-pox. The invasions of these pestilences in our own time, afford the most incontrovertible evidence that their history was either unknown or completely ignored. Foot-and-mouth Disease had been recognised on the Continent for nearly two centuries before it arrived here, and its rapidly diffusible and contagious properties had been familiar to foreign veterinarians for more than fifty years. Yet when it was introduced into England, in 1839, nothing whatever was known regarding it,—it was a *new* disease, due to "something in the air," and its previous existence never appears to have been thought of. Consequently, it was allowed to extend itself over the three kingdoms,—its infectious character not being recognised, and to domicile itself, as it were, among our stock. The very same thing occurred with the terrible Pleuro-pneumonia, two or three years afterwards. This harassing scourge had been studied on the continent of Europe towards the end of last century, and while it had been gradually extending its ravages in countries where it had previously not been seen, its nature and the cause of its extension had been investigated by veterinary surgeons in these regions. But in England it does not appear that this information, or even the existence of the malady, was known. Consequently, no precautions were taken to prevent its introduction, nor were any steps adopted to ascertain its pathology, or whether it was a transmissible disease. This ignorance of the history of Pleuro-pneumonia has been attended with the most lamentable and disastrous results; for not only

has this country suffered most severely, but from it, and for the same reason, the disease has been carried to nearly every part of the inhabited world—to America, Australia, New Zealand, South Africa—and even to Central Africa.

We find the same indifference to the history of Cattle Plague leading to similar disasters. Some time ago we were assured that "no fear need be entertained that this destructive pest will reach our shores. . . . . All alarm, we believe, may cease with reference to its introduction into the British Isles." Since these words were penned, the terrible invasion of 1865, and three other visitations, have occurred. The veterinary authority who gave this opinion asserted at the same time that "the ox tribe is alone susceptible to the disease." History shows that, more than a century ago, sheep and other ruminants were infected and died in great numbers.

The same remarks might be made with regard to Sheep-pox; but we need not allude further to this malady, than to mention that vaccination was tried as a protective measure in this country not many years ago, though it had been tested by many experimenters on the Continent long before, and proved to be useless.

We might quote innumerable instances to prove the value of a knowledge of the history of veterinary medicine, and the disadvantages resulting from ignorance of it; but for the present we forbear. If society is to benefit in the largest measure from our science, and if we are ever to achieve that position for it which we have so earnestly striven to obtain, this history can no longer be ignored. So long as we are unacquainted with it, we lose a most valuable incentive to labour, and the accumulated experience of generations of men who were learned in their way and in their own particular line; while we impose upon ourselves the Sisyphean task of trying to accomplish very much work which has already—perhaps ages ago—been completed. We must not always remain in a state of childhood by ignoring what has been done before our time.

ON THE LIFE HISTORY OF BACILLUS ANTHRACIS.*

BY J. COSSAR EWART, M.B., UNIVERSITY COLLEGE, LONDON.

THROUGH the kindness of Dr. Burdon Sanderson, Superintendent of the Brown Institution, I have been enabled to repeat the well-known inquiries of Cohn and Koch † into the life history of *Bacillus anthracis*. This organism has been described as a motionless, rod-shaped bacterium, which, when kept at a temperature of 32° C., lengthens out into a long thread-like filament, in

* The author has kindly furnished us with the proof of this interesting and important paper, which recently appeared in the *Quarterly Journal of Microscopical Science*.—ED. *V. J.*

† 'Die Ætiologie der Milzbrand-Krankheit, begründet auf die Entwicklungsgeschichte des *Bacillus anthracis*.'—"Beiträge der Biologie der Pflanzen," Zweiter Band, Zweiter Heft, 1876.

which numerous bright oval spores are formed. The spores, when set free by the disintegration of the filament, develop into rods which, when introduced into the subcutaneous tissue of an animal, increase indefinitely by a process of tranverse fission, and set up Splenic Fever.

In repeating the experiments made by Koch and others, I have especially directed my attention to the phases through which the rods and spores pass, and, along with Dr. Burdon Sanderson, I have endeavoured to prove that the spores do not, as stated by Pasteur, resist the influence of boiling and of pressure.

In carrying on this investigation I made use of a hot chamber, but found of especial service the warm stage * introduced by Mr. Schäfer. Through it I was able to keep the same preparation under observation at the same temperature for an indefinite time. Preparations cultivated in the warm chamber were made by fixing a thin glass ring to a glass slip by means of Canada balsam, Brunswick black, or paraffin. The edge of this ring was covered by a thin layer of olive oil, and the cover glass, with the drop of aqueous humour containing the rods, was placed carefully over it. In the same way the cover glass containing the specimen was placed on the warm stage, but when the same cultivation was likely to be under observation for a number of days, it was always advisable to fix the cover glass to the brass plate by means of paraffin.

On examining a small piece of spleen or a drop of blood from the spleen of a mouse, which had just died from Splenic Fever induced by inoculation, in a drop of fresh aqueous humour from a rabbit, numerous motionless rods were seen lying amongst the spleen tissue and blood-corpuscles. The rods varied in length, the shortest being nearly twice the diameter of a human red blood-corpuscle; the longer ones were two or three times the length of the shorter, but when carefully examined they were almost invariably seen to be in process of division into two or more segments.

At first the bacilli were absolutely motionless; but in some cultivations, after keeping the temperature at 33° C. for a few hours, a great number of them began to move actively about the field. By watching for several hours the bacilli in a part of the field enclosed by spleen *débris* and blood-corpuscles, it was evident that they all closely resembled each other, that they were alternately at rest and in motion, and that some of them lengthened out into filaments. While at rest they were not altogether without change, for clear lines appearing across them indicated that they were in process of division into segments. Sometimes a number of rods ceased moving, and previous to lengthening out into filaments arranged themselves into patches of zooglœa.

When any particular rod was observed for some time, it might be seen first slowly to move backwards and forwards, then the movements gradually increased, until it wriggled in a very active manner from one side of the enclosed space to the other. Having continued active for some time, it would either suddenly or gradually settle down again, as if exhausted, into its former quiescent condition. I have seen rods moving when, with the No. X. Hartnack, they appeared from half an inch to three-quarters of an inch in length.

The division into two or more pieces is not always a very rapid process. A rod which was watched till it divided was at first made up of three pieces, and one of them from the beginning looked as if it might at any moment detach itself from the others; but after six hours' almost constant struggling, though by that time able to remove itself half its own length from the other two segments, it was still connected by a very delicate thread; and before

* See figure of warm stage in Mr. Schäfer's "Practical Histology." The stage may be had from Mr. Casella, 147, Holborn Bars.

separation, which took place after being under observation for over seven hours, it in a comparatively short time was divided into two segments, so that, when it did escape from the other apparently inactive pieces, it wriggled about the field like two freely movable links of a chain.

After assuming this motile phase for some time, the rods lengthened out into spore-bearing filaments. A mouse inoculated with the spores thus obtained died forty-eight hours after, presenting all the usual appearances of Splenic Fever, and thus proving that the motile rods were none other than a hitherto undescribed phase of *Bacillus anthracis*.

What the conditions are which lead to these movements remains to be discovered. Apparently the same conditions do not always lead to the same results, for several generations may elapse before the motile phase again appears.

The lengthening of the rods into filaments is an extremely rapid process, and is apparently effected by the temperature. In five hours a rod, at a temperature of 32° C., may have increased so as to be from eighty to a hundred times its original length, and in twenty-four hours the filament may be full of spores. If the temperature, however, is kept about 28° C., the spores may not appear till the thirty-sixth or fortieth hour. When the spores have once appeared, all the other changes go on at ordinary temperatures, from 12° to 18° C., but not nearly so rapidly, even when the preparation is kept in the sun for a few hours daily, as when artificial heat is applied. On the other hand, a high temperature, 37°—40° C., at once checks all developmental changes.

The filaments differ very much in their arrangement. Sometimes they form a network—indeed a mycelium—made up of bundles of numerous, nearly parallel, unbranched threads, crossing each other at different levels; the threads are sometimes straight, but have generally a wavy outline. This condition may obtain throughout the whole preparation, but generally at some parts the filaments are extremely irregular and much convoluted. In some cultivations all the filaments may be so irregular that they may best be compared to an entangled skein of white silk; and when this is the case, beautiful rope works, made up of from two to four regularly twisted loops, radiate for a considerable distance from the edges of the preparation. Still more beautiful are these silken ropes, when the threads of which they are composed are studded at irregular intervals with bright refractive oval spores.

The filaments when first formed are perfectly hyaline, but soon the central protoplasmic contents can be distinguished from the gelatinous-looking sheath. The protoplasm next divides into numerous short pieces, each being about the size of the original rod out of which the filament was formed. These contract, leaving clear apparently empty spaces between them, and often again divide to form still shorter masses of protoplasm.

At each side of this transverse line of division minute clear specks appear—the first indication of the spores. These gradually increase in size and in brightness, and as they increase the protoplasm disappears: in fact, the spores seem to be developed out of the protoplasm. This process seems to correspond with the formation of chlamydospores in mucor. The spores thus formed have a regular arrangement, except when only one spore is formed out of the original long piece of protoplasm. Soon after the appearance of the spores the filaments seem to be made up of numerous segments, each segment containing one spore, the spores lying at the adjacent ends of the segments. Then one of several changes may follow. In the first place, the gelatinous-looking envelopes which now surround the spores may so swell that the filament gives way, thus allowing the spores to escape. Again, the filament may break up into long and short pieces, the spores for some

time remaining in the detached segments; or the filaments may remain entire, retaining all the spores *in situ*. Whatever happens, the filament as it disintegrates gets first granular, and then almost entirely disappears. While in a granular condition minute clear spots are visible at the points recently occupied by the spores.

When the filaments break up into short segments, in many cases containing a spore at one end, they may be easily mistaken for germinating spores. Young rods, however, as long as the remains of the spore are visible in them, are rounded at both ends; whereas pieces of filaments containing spores have always square or irregular ends. When the filament remains entire, its existence through time can only be inferred by the spores retaining exactly the same position as they occupied when first formed.

Let us now consider the changes through which the spores pass in order to form rods. As a rule, the spores begin to escape from the filaments on the third day of cultivation, and only the *débris* of the filaments is visible on the fifth day. When they escape they are motionless, bright, refractive, oval bodies, surrounded by a thin, hyaline, gelatinous-looking envelope, and measuring, according to Cohn,* $\frac{18}{2500}$–$\frac{22}{2500}$ of an inch in their long diameters.

The spores when free, according to previous observers, at once grow into rods, and according to Koch at least, the rod is formed out of the gelatinous-looking envelope surrounding the spore. My observations lead me to believe that the spore does not always at once grow into a rod, but that it divides into four sporules by a process of division, in which the envelope, as well as the spore, takes part. This division I have even seen beginning before the spore escaped from the filament; and that it is not a degeneration is certain, for I have watched the sporules thus formed lengthen into rods. This free cell formation I have had verified by many competent observers. It is best seen at a temperature of 20° to 25° C., and may even be seen at ordinary temperatures; and it is generally found when the cultivation has been continued for seven or eight days in the same drop of aqueous humour.

This process of cell division exactly corresponds to what takes place in other cells—that is, the spore elongates, then becomes dumb-bell shaped, and lastly divides into two round bodies, which are at first small and touching each other, and enclosed by a capsule still single. As they increase in size and separate from each other, the capsule also becomes constricted and ultimately divides, and thus we have two perfectly round, bright bodies, surrounded by a thin hyaline capsule, developed from the original oval spore. Each of these round bodies now undergoes the same process—thus producing four sporules, all at first closely adhering to each other, but soon becoming free; and after dancing about in the fluid along with others formed in a similar way, settling down to form a colony similar to, but easily distinguishable from, a group of micrococci.

If a particular group of sporules are next watched, they may be seen to germinate. Dr. Koch states that the rods are developed from the gelatinous-looking capsule, and not from the bright shining spore. From what I have seen, I think there can be no doubt whatever that the capsule takes no active part during the formation of the rod. The sporule first slightly elongates, and then from one of its poles an opaque process appears, which, as it slowly lengthens, pushes the capsule before it as it would an elastic membrane. The capsule, as this stretching goes on, becomes at last so thin and transparent that it can no longer be distinguished from its contents.

Contrary to one's expectations, the remains of the spore or sporule retaining its original brightness persists a considerable time after the rod has been fully formed. Whether it disappears altogether I cannot say. I have often seen in rods a small oval body, which might either be looked upon as the

* "Beiträge zur Biologie der Pflanzen," ii., 2, 1876, p. 264.

remains of the spore, as a nucleus, or as a vacuole. Very interesting results are often obtained when the same cultivation is kept under observation for twelve or fourteen days. By this time probably both the oxygen in the small amount of enclosed air and the nourishment in the drop of aqueous humour has been exhausted; hence not only do we find apparently degenerative changes taking place in the spores, but the filaments are also modified. In fact, the newly-formed rods may scarcely increase at all in length, but even in such rods new spores, as large and as well formed as those of the first generation, may appear. Even when the rods increase from three to ten times in length only a very few spores may be formed, and these at very irregular intervals. That these modifications result from want of proper nourishment we may safely infer, seeing that when fresh aqueous humour is added, the formation of filaments and spores goes on again as actively as in a fresh preparation.

Several experiments were made in order to ascertain whether the presence of other bacteria in any way influenced the development of bacillus.

1. A piece of spleen containing rods was placed on the warm stage. At first the rods began to lengthen out into filaments in the usual way, but when the filaments were with the No. 8 Hartnack apparently two inches in length, currents of impure air were admitted under the cover glass and a small drop of aqueous humour containing ordinary bacteria was added. After this the rods continued to increase until they were apparently three inches in length, but as soon as *Bacterium termo* and other organisms introduced became active, all life in the filaments seemed to cease, no spores appearing in them; the filaments, in fact, became granular, and soon went to pieces.

2. In another cultivation the spores were allowed to appear before any other bacteria were added; but, although thousands of micrococci were added, as well as a great number of very active ordinary bacteria, the developmental changes went on unchecked, and when a mouse was inoculated with the spores formed, death took place at the usual time.

3. Pieces of spleen containing rods kept moist at a temperature of 37° C. in free communication with the ordinary atmosphere rapidly putrefied. When examined, no vestiges of rods or filaments were found; and when pieces so treated were introduced under the skin of mice no symptoms of Splenic Fever or Septicæmia resulted—thus proving not only that the ordinary bacteria had destroyed all the rods and spores, if spores were present, of *Bacillus anthracis*, but also that ordinary bacteria, when introduced under the skin of a healthy animal, are innocuous.

4. Pieces of a spleen containing rods were placed in aqueous humour, in blood serum, in Pasteur's solution, in serum from the subcutaneous tissue, and several portions were sealed up in a small test-tube without any fluid being added. These were kept at a temperature of 30° C. In the aqueous humour, blood serum, and in the serum from the subcutaneous tissue, the rods lengthened out into spore-bearing filaments; but no changes occurred in the rods placed in Pasteur's solution, nor in the rods in the pieces of spleen simply sealed up in the test-tube.

5. Blood, spleen, or peritoneal fluid, containing rods or spores, which at a moist temperature of 37° C. perish, may be dried at a temperature of 38° to 40° C., and still retain their power to set up Splenic Fever. The rods in the outer layers of the dried masses are destroyed, but those in the centre retain their activity.

Further, rods or spores in tissues or fluids remain active when sealed up in capillary tubes, and also when kept at a temperature approaching freezing point. Although mice are easily killed by inoculation, they do not seem to be influenced in any way when rods and spores are mixed with their food, unless there is some abrasion about the nose or mouth; neither do they seem capable of being infected by inhaling the spores. The spores may be found

in the alimentary canal of such mice, sometimes as if in process of development into rods and filaments.

Seeing that the rods are constantly dividing, and that the spores divide into sporules, it is impossible to make any definite measurement of either; and it is further scarcely advisable to say that rods and spores apparently somewhat smaller belong to a different species, seeing that the difference in size may be due to the change of *habitat*—the rods of *Bacillus anthracis* being always longer, for example, in guineapigs than they are in mice.

The life history of *Bacillus anthracis*, from what has been said, may be epitomised as follows:—To begin with the well-known resting rod. This rod, if in living tissues, multiplies indefinitely by a process of transverse fission, but it never seems to lengthen out into a filament; if, however, after death a sufficiently high temperature be maintained and other conditions be favourable, it may lengthen out into filaments the protoplasm of which contracts into spores.

On the other hand, if cultivated on the warm stage under artificial conditions, it may become motile, though rarely; but after being alternately at rest and in motion for some hours, it lengthens out into an exceedingly long filament—probably much longer than that found in natural conditions. The protoplasm next divides into numerous segments, which may again divide and then rapidly contract to form spores.

The spores escape from the disintegrating filaments, and may either at once germinate into new rods or divide into four, not at all unlike Protococcus. These sporules then germinate and form rods similar to those with which we started. Thus the cycle is completed.

The most important morphological conclusion which follows from these and other observations is that micrococcus-forms, bacterium-forms, bacillus-forms, and spore-bearing hyphæ, are in nowise generically distinct, but that they are simply phases of the same life history—a life history doubtless common to all other bacteria.

In the rarely occurring motile phase we find a condition which we constantly find in ordinary bacteria; moreover, the formation of a true aseptate mycelium closely resembles Mucor—an analogy rendered closer when we reflect that the spores of *B. anthracis* are really chlamydospores.

We now have to mention the results following upon boiling and compression of the spores.

Since Pasteur stated that the spores of Bacillus remained active after boiling, much has been said about their wonderful tenacity of life. Having a fair quantity of spores at our command, Dr. Burdon Sanderson suggested that we should test the accuracy of the above statement. Accordingly, along with Dr. Sanderson, I added to the aqueous humour containing the spores a small quantity of distilled water, and after carefully stirring the mixture a mouse was inoculated with a few drops, an absolutely clean syringe being used. The rest was boiled for five minutes, and then with a fresh syringe another mouse was inoculated, and so on, after boiling at different periods up to a quarter of an hour.

The result was that in two days the mouse inoculated with the unboiled spores was found dead, but the others remained absolutely unaffected. Again, spores and rods were treated in exactly the same way and with exactly the same results; the spores were rendered inactive after even two minutes' boiling. But thinking newly cultivated spores might be more easily destroyed than old dried ones, we boiled blood containing spores which had been kept dry for five years. The same results followed; the mice inoculated with the solution before boiling died; those inoculated after boiling were unaffected.

It may be mentioned that mice are very susceptible; in no case has the smallest number of spores introduced into the subcutaneous tissue failed to prove fatal.

We next directed our attention to the other fact mentioned by Pasteur—viz., that the spores were not rendered inactive when subjected to a pressure of twelve atmospheres of oxygen. M. Bert repeated M. Pasteur's experiment, but found that the spores were destroyed; hence it was all the more necessary, though perhaps a point of little practical importance, to endeavour to make out what influence compression really had. This experiment we were enabled easily to perform through the kindness of Mr. J. Millar Thomson, of King's College, who supplied us with the necessary apparatus.

The spores were suspended in a solution of distilled water in an ordinary test-tube, which was placed in the cylinder, and twelve atmospheres of oxygen allowed freely to come in contact with them. After subjecting them to this pressure for twenty minutes they were introduced under the skin of a mouse, but without producing any indication of Splenic Fever or any other abnormal condition.

A mouse inoculated with a few drops of the uncompressed solution died, and presented, as before, all the appearances of Splenic Fever.

SERIOUS MORTALITY AMONGST THOROUGHBRED FOALS IN ENGLAND.

FROM various sources we have received reports of heavy losses in foals, at several of the larger breeding establishments in this country—especially at Hampton Court, Cobham, Newmarket, Middle Park and Mentmore. According to the *North British Agriculturist*, they perish from a peculiar febrile complaint. Foals under six weeks are the most frequently and seriously attacked. They suddenly look dull, neglect their food; febrile symptoms set in, the mouth is hot, the pulse numbers 120, the temperature in a few hours advances to 102° or 103°; the bowels are usually disordered and unduly relaxed, and the mucous membranes have generally a dirty yellow appearance, pointing to impaired function of the liver. In a few days the joints swell; the stifle, hock and knee joints are particularly enlarged and tender, and their slightest movement causes pain. Occasionally abscesses form about the joints, and burst, still further increasing irritation and prostration. From the pain and fever the temperature rises to 106°. Some of the more acute cases in young foals die in three days; others, especially the older foals, with more reserve strength, live for three weeks, and sink exhausted from inflammation of the joints and Pyæmia. The *post-mortem* appearances vary somewhat according to the duration of the disease. The areolar tissues about the larger joints are infiltrated. The synovial fringes, especially of the larger joints, are inflamed. The articular cartilages are ulcerated. The mucous membrane of the bowels is congested, and sometimes inflamed. The liver is congested, enlarged, soft, and friable. The kidneys are soft, and often contain pus. The blood appears deficient in fibrine; under the microscope its red globules are shrivelled and crenated. The disease is supposed by one gentleman, who has watched upwards of a score of these cases, to consist in a peculiar febrile gastric derangement, complicated with congestion of the liver; blood-poisoning early appears; inflammation and Pyæmia supervene. He does not believe it to be contagious, and considers it to be connected in some way with the peculiar mild open winter and early flush of spring grass.

Medical treatment appears to have been markedly unsuccessful—a circumstance due, we venture to think, to an absence of knowledge in this country as to the pathology of the disorder, and the immediate cause or causes upon which its development depends. Yet no disease has attracted more attention, and few have received more careful study, on the Continent

than this destructive disease of young animals. From time to time it has ravaged the haras or studs of the different European Governments, and foreign veterinary literature abounds with historical records of these outbreaks, as well as with the detailed reports of investigators, during the last and the present century.

Those who are interested in the subject will find it fully treated under the heading of Arthritis, at p. 723 of the "Text-Book of Veterinary Obstetrics," recently published.

It is somewhat strange that, in giving the pathological changes observed in this disease, the writer in the *North British Agriculturist* makes no mention of the condition of the umbilical vessels. Have we no member of the veterinary profession in this country—no professor with leisure on his hands, knowledge in his head, and scientific enthusiasm in his breast—who will undertake the all-important task of investigating this and similar diseases whose pathology is so obscure and destructiveness so great? Or must this task, which should fall to the lot of veterinarians, be allotted, like some others of this kind, to members of the sister profession?

MILITARY HORSE-SLAUGHTERING.

A NEW function imposed upon the army veterinary surgeon would appear to be that of horse-slaughterer. Not that there is any novelty in a member of the profession destroying the life of a horse which disease or accident has permanently disabled, and thus putting an end to its sufferings. Many have taken upon themselves this merciful office; and, to prevent mishaps or bungling, we have personally volunteered to shoot a large number at different periods. But we are not aware that at any time it was considered the army veterinary surgeon's duty to slaughter horses—though a recent occurrence at Aldershot would lead us to infer that such is now the case. That this officer should be acquainted with the different, most prompt, and least painful modes of destroying animals, and be even competent on emergencies to carry them into effect, is one thing, but to be compelled to perform this duty on every occasion is quite another matter. The occurrence which has brought this question to the front is graphically alluded to in the following letter, which recently appeared in a military contemporary:—

"The facts, I believe, are these: Lord Napier's favourite charger, whilst standing in a crowd of other horses at a recent grand review at Aldershot, when the Crown Prince of Prussia, the Duke of Cambridge, and other distinguished individuals were present, received a kick from another horse, which shattered the thigh bone. Two veterinary surgeons promptly attended, who at once saw the hopelessness of the case, and advised that the horse should be destroyed, as is always done in like cases, for reasons which it is not necessary here to mention. No ball ammunition being on the ground—a distance from camp—a messenger was despatched for some. In the meantime the horse stood with his leg dangling, an object of pity and compassion to the crowd of distinguished officers present, who appear to have been seized with an irresistible impulse to put the poor brute out of his misery. First one wearer of a cocked hat rushed at the veterinary surgeons: 'Why don't you open an artery, sir?' Then cocked hat No. 2 rushed up: 'Why don't you blow down a vein?' Then cocked hat No. 3: 'Why don't you cut his throat?' Then cocked hat No. 4, rifle in hand: 'Here, sir, take this; it is loaded with a blank cartridge; I order you to shoot him.' In fact, one would have thought that the poor beast was rabid, and that the very existence of the whole army depended on

his being got rid of as fast as possible. And so it went on, until the veterinary surgeons became so bewildered by the orders of the many distinguished officers around, that it was really a mercy that no ball ammunition was present, or in their nervous trepidation they would very likely either have shot themselves or a cocked hat; as it was, they made some bungling efforts, and directly the horse was dead the ball cartridge arrived. Now to examine all this closer. Veterinary surgeons are not professional horse-slaughterers; they have not hitherto been in the habit of destroying horses, and from want of practice I doubt if many could. This duty has always been performed by some non-commissioned officer—generally the farrier-major or a farrier-sergeant. The course adopted in such cases, as laid down in the Queen's Regulations, is as follows: 'The veterinary surgeon, after examining the horse, reports to the commanding officer that the case is hopeless; a board of officers then assembles, who take the veterinary surgeon's evidence, see the horse, and recommend him to be destroyed.' All this takes time, and the farrier is at hand to carry out the orders of the board. It will be seen that the case is taken out of the veterinary surgeon's hands from the first, and he is not allowed to shoot the horse on his own responsibility. Again, what reason or sense was there in this hot haste to kill the poor beast? Supposing that it had unfortunately been the leg of Lord Napier instead, the doctors would have rushed to him, not to shoot him, of course; but would they, during the process of setting the limb, have relieved him of pain? No, his sufferings would have been increased, and continued for weeks in all probability; and yet, because this horse stood for an hour only in the same state, we have all this outcry. The whole proceeding seemed fussy and undignified. The truth is, there was a crowd of staff officers in so distinguished a throng bursting with zeal and energy; the fiat had gone forth he must be killed, and they had not patience to wait to have it done in the usual way, and so fell upon the unfortunate veterinary officers because they did not expedite the process. I admit there are means of destroying a horse almost instantaneously besides shooting him, and that the two veterinary surgeons who were present were not prepared to meet the emergency; but these measures require practice, and are certainly not to be carried out when bewildered with orders and surrounded by a distinguished crowd. With a penknife the carotid artery might have been slit up, or he might have been 'pithed.' Blowing down a vein will kill instantly sometimes, but not always; and if it does not, the suffering is great. A blank cartridge will kill if fired over the eye or under the ear. A few pebbles rolled in paper and placed in front of a blank cartridge might have been used. The occurrence was unfortunate in every way, but I think the veterinary surgeons are not fairly dealt with in the matter. It is not their fault that they are not in practice and prepared for a duty which they have not hitherto performed, and they are certainly not to blame because no ball ammunition was on the ground. One newspaper, commenting on this case, asks, 'What is the use of having veterinary surgeons attached to cavalry regiments?'—as if their special duty was to kill horses. What with the abuse heaped upon the veterinary surgeons for not curing their patients, and now for not killing them, they have rather a hard time of it."

There can be no doubt that the presence of dignified personages acted on the staff officers present in the usual powerful manner, and that their immense store of latent zeal was attempted to be displayed to the most profitable advantage. Had the horse been Private Smith's trooper, or even had the fractured bone been that of Private Smith himself, the grand exhibition of zeal and superior knowledge would have been reserved for a more conspicuous opportunity, and Smith or his steed must have fared as many others have done at Aldershot.

The effusion of blood, in killing animals, is always disagreeable, if not shocking, to spectators; and veterinary surgeons should not countenance it when it can be avoided. When the animal could not be shot, in order to prevent a sanguinary spectacle we have promptly caused death by introducing the hand, armed with a small knife, well forward into the rectum, then cutting upwards, and across the lower surface of the spine, so as to divide the posterior aorta or iliac arteries.

In using a rifle or carbine to shoot horses, a word of caution is needed, as on several occasions we have witnessed narrow escapes from very grave accidents. With the regulation charge of powder in the cartridge, the bullet will often pass through the animal's head and travel a great distance; or it may strike against a wall and pursue a very erratic course, endangering the lives of people in the neighbourhood. It is advisable, therefore, to take due precautions, and to diminish the quantity of powder. But for years we have not resorted to rifle or carbine, and on field days and at other times have had a revolver and ammunition at hand. The horse should be shot in the forehead, between and about one or two inches above the orbits—the bullet being made to pass through the brain towards the medulla oblongata, where it should lodge. Death is instantaneous, and the operator is perfectly safe in steadying the animal's head with the left hand while he shoots with the right. The knees and hocks at once flex, and the horse drops dead on the ground on which he stood. Should the bullet not have destroyed the respiratory centre, the brain tissue may be broken up by introducing a piece of wood or cane into the opening. If army veterinary surgeons must play the part of horse-slaughterers in addition to their other manifold and multiform duties, we would earnestly recommend their employing the revolver, and in the manner we have indicated.

NEW DRUGS AND APPLIANCES.

Calvert's Carbolic Acid.

It is scarcely necessary, at this time of day, to draw attention to the value of carbolic acid as a therapeutic and sanitary agent. Perhaps there is no substance in the veterinary pharmacopœia which can be more extensively and profitably employed, or the use of which is of such wide application. Almost every day finds it utilised in a new direction; and in the contagious and septic maladies—whether as a preventive or curative agent—its services are simply invaluable. In order to derive full benefit from carbolic acid, and be able to rely upon its action, it is above all things necessary that it should be genuine, and reliable for the purposes for which it is specially required. Impure or crude carbolic acid should not be employed on any occasion in veterinary practice, as its use will not only lead to disappointment, but may result in dangerous consequences if used medicinally. Though it may be cheaper in the market, yet it is far less profitable than proved and guaranteed acid. It has been for a long time universally recognised that Calvert's carbolic and cresylic acids are the best and most reliable—and therefore the cheapest—in the market. We have largely used the different preparations of carbolic acid sold by Calvert and Co., and can testify to their excellence. To the veterinary surgeon, whether in the form of soaps, powder, washes, dips, lotions, disinfectants, antiseptics, or for external or internal use, we can strongly recommend these preparations. In putrid diseases, and in the treatment of wounds and inflammations which assume an unhealthy character, we have found the greatest benefit from the employment of the

No. 5 acid. Its value has been recently tested most successfully in Metritis ("Straining") in ewes after parturition.

QUINETUM.

The value of quinine in the treatment of the diseases of animals has long been established; but its high price, and the larger quantities required by them than by mankind to produce a certain effect, have greatly operated in excluding it from use by the veterinary surgeon. Mr. Whiffen has done well, we think, in bringing before the profession his "Quinetum," which contains the pure alkaloids of East India Red Bark (*Chinchona succirubra*), *i.e.*, Quinine; Cinchonidine, Cinchonine, and Quinoidine; and also his Sulphate of Quinetum. In Canine Distemper, Influenza, low fevers, debility, and in convalescence from debilitating diseases, we have tried these alkaloids, and with the happiest results. At less than one-half the cost of quinine, Mr. Whiffen's Quinetum appears to us to be as serviceable for veterinary patients as that drug. We are satisfied that it is a valuable addition to the remedies employed by the veterinary practitioner.

VASELINE.

Vaseline is a pure and highly concentrated essence of petroleum, and as prepared by the Chesebrough Manufacturing Company, is refined without distillation or chemicals. It is a dense oleaginous substance, of the consistency of butter or jelly; it melts at 94°, evaporates at about 500°, does not crystallize or oxydize, and, it is asserted, will never become rancid. Its colour is a light translucent opal; it has neither odour nor taste, and is perfectly neutral. In human medicine it has been highly lauded as an external and internal remedy. Externally it is used as an emollient and liniment, as well as an anodyne application; and internally it has been employed to great advantage for coughs and all affections of the air-passages. Being odourless and tasteless, its internal administration is easy.

For certain internal diseases of animals—and especially those of the respiratory organs—vaseline should be found very useful. For diseases of the skin—as Eczema, Erythema, Acne, Prurigo, loss of hair, etc.—we have found it yield excellent results; while its uses in the pharmacy are manifold. Being incapable of change and never becoming rancid, it is an excellent base for ointment and embrocations; and as it readily combines with sulphur, camphor, iodine, bromine, carbolic acid, and similar substances, the active principle of these medicaments will remain unimpaired for an indefinite period. In India, vaseline should prove a most valuable article for veterinary purposes; while in this country it will be found worthy an extensive trial.

The Chesebrough Company offer a "Veterinary Vaseline" much cheaper than that recommended for employment by medical men; but we have found it to be quite as useful.

THE PATHOLOGY OF PURPURA HÆMORRHAGICA.

THE exact nature of the morbid condition designated Purpura Hæmorrhagica in the horse, appears to be, as yet, not clearly made out. Williams, in his "Principles and Practice of Veterinary Medicine," classes it with Anthrax, as the following sentence shows: "Under this term, Septic or Charbonous Fever in the horse has been described by late writers on veterinary medicine."

But Septic and Charbonous (or Anthrax) Fever are quite different disorders, which have often been confounded.

Röll, in the last edition (the fourth) of his excellent work, "Lehrbuch der Pathologie und Therapie der Hausthiere," under the head of "Pferdetyphus," also considers this an Anthrax disease. Several years since we carefully investigated the nature of Purpura Hæmorrhagica, and could not find in it any attribute of Anthrax. Quite recently, the occurrence of the disorder among army horses at Woolwich and Aldershot gave us an opportunity of again examining it—the inspecting veterinary surgeons at each of these stations having obligingly forwarded us blood from animals so affected.

This blood has been most carefully inspected, microscopically, and not the faintest trace—neither rods nor spores—of *Bacilli* could be detected. Micrococci and beautiful micrococci chains were plentiful, also spores and filaments of *Penicillium glaucum*—these having obtained access to the blood after that fluid had been withdrawn from the vessels. The *débris* of white corpuscles were likewise observed, and great numbers of the red corpuscles were extremely irregular in outline. Mice inoculated with the blood remained healthy.

So far as these investigations go, there appears to be no reason to class Purpura Hæmorrhagica with Anthrax, which it otherwise widely differs from in its origin, symptoms, and course.

FRENCH VETERINARY CONGRESS.

THE Veterinary Congress, which is to be held in Paris during the Universal Exhibition, is to commence its sittings on September 8th, and continue until the 15th of that month. The inauguration of the statue of Claude Bourgelat, the illustrious founder of the French veterinary schools, and, it may be said, the founder also of modern veterinary medicine, will take place in the Court of Honour of the Alfort School at this time. It is noteworthy that the profession—individuals and schools—in every country contributed to this memorial of a great man; but in the published list we find that England is only represented by one name. It may also be remarked that the veterinary profession in this country has given no response to the appeal in favour of a monument to our own Harvey, whose grand discovery of the circulation of the blood has benefited animal medicine as much as that of mankind.

LOODIANA DISEASE.

INOCULATION experiments with the blood from a horse affected with the Loodiana Disease of India, sent to us by Dr. Evans, Royal Artillery, have yielded no results. They were made on guineapigs and mice—creatures eminently susceptible of Anthrax infection. In a note added to Dr. Evans' paper in last month's *Journal*, we mentioned that the blood and mucus contained great numbers of Anthrax *Bacilli*. The mucus, having been mixed with alcohol, was not suitable for inoculation; and the failure of the dried blood to produce the disease was probably due to the absence of spores in it. Should Dr. Evans, or any other correspondents who have the opportunity, send us blood for inoculation, we would recommend adding a drop or two of that fluid to a small quantity of fresh aqueous humour, and enclosing this in a very small bottle, or capillary or vaccine tube.

CONTAGIOUS PLEURO-PNEUMONIA IN AMERICA.

IN considering the question of admitting live cattle to this country from the United States of America, it may be well to remember that Contagious Pleuro-pneumonia is not unknown in some of the States, and that trade in live stock with them is far from being safe. Of the extent to which the malady prevails, and is likely to prevail, on the other side of the Atlantic, we gain some idea from a paper on "Veterinary Reform," by Mr. Paaren, published in the May number of the *American Veterinary Review*. Mr. Paaren writes: "The Contagious Pleuro-pneumonia of cattle is stealthily, slowly, and almost uninterruptedly gaining ground in the Eastern States. If it were not for the fact that the current of trade in cattle on this continent is almost exclusively eastward, this disease would long ago have found its way to the Pacific coast. Nevertheless, it would be folly to expect immunity from this plague in the west; for at no distant day will its presence here be a settled fact. And what should prevent it? No measures, legal or otherwise, exist for the prevention of its spread. The further this plague extends westward, the less will its progress be interfered with; because the almost entire absence of qualified veterinarians leaves the farmers and stock-owners in ignorance of the presence of the disease among their stock, until serious and wide-spread losses have been sustained; and when the local or state authorities at last shall be compelled to take the matter under consideration, it will have spread far beyond our control. The extension westward of the Contagious Pleuro-pneumonia will most likely be effected by means of trade and traffic only. The disease affects blooded (high-bred) cattle, as well as common stock. If common stock is not shipped westward, blooded stock is, and by this means it may be brought right in among cattle ranges in the territories. The cattle-trucks may be another source of its spread westward. We all know that the use of these is not confined to the length of a track of any of the eastern railroad corporations, but traverse the network of tracks extending over the whole length and breadth of the land. Contemplate for one moment the result, when once this plague gets a foot-hold on the large cattle-ranges of the plains. Our half-wild cattle on the ranges will communicate this disease to the buffaloes, and these again will cause its spread from north to south, all over the territories, without limitation or control."

Surely if America is to continue to enjoy the privileges, almost specially accorded to her, of an uninfected country, she will endeavour to check the progress of a malady which is one of the most serious that can attack the agricultural wealth of a community, and which Great Britain has every reason to dread even more than the Russian Rinderpest.

DISEASE AMONG ARMY HORSES IN INDIA.

A GENERAL ORDER to the Bombay Army, dated Simla, January 29th, published in the Official *Gazette of India*, directs strict compliance by commanding officers of the mounted branches of the Indian army with a series of stringent rules for the care of cavalry and artillery horses. Horses in India, it is well known, are liable to suffer from the epizoöties of the country—one of these being the so-called Loodiana Disease, and another Farcy and Glanders. The General Order requires that, on the outbreak of the Loodiana Disease, the whole of the horses used for military purposes at army stations should be at once removed "to a distance of not less than 300 yards from their lines, to untainted ground, which should not be occupied for a longer period than one month, when another change of locality should be made."

REPORT ON THE PATHOLOGICAL ANATOMY OF BOVINE CONTAGIOUS PLEURO-PNEUMONIA.*

BY GERALD F. YEO, PROFESSOR OF PHYSIOLOGY IN KING'S COLLEGE, LONDON.

INTRODUCTION.

THE difficulties which present themselves in attempting to study the pathological anatomy of the diseases of cattle, are increased in the case of Pleuro-pneumonia by the legal restrictions which compel the slaughter of beasts affected with it. In most instances the animals are slaughtered suddenly, by order of the authorities, allowing no time for notice to be sent, so as to enable one to reach the scene of action. It is therefore only by means of the combined kindness of a number of disinterested persons that a *post-mortem* examination can ever be witnessed, and then only at the expense of much time and trouble spent in reaching some remote locality. Moreover, the inspection of the autopsy but poorly repays the personal inconvenience which must be gone through in order to attend it, for the slaughter and evisceration of the animal must always be conducted by some practised operator, whose dexterity depends upon his rigidly adhering to a certain methodical system, which is not framed with a view to pathological investigation. The necessary operations are performed with such skill and rapidity, that no time is allowed for the pathologist to contemplate the relative position of the morbid parts, or to reflect on the possible pathogenic relation which one may bear to another.

It is a well recognised fact that in order to make a description of the pathological anatomy of any disease at all adequate, or of scientific value, all the viscera should be examined in every case, so that the most trivial abnormality may be noted. In the lung disease of cattle this may be regarded as impossible. Besides the difficulty of attending the slaughter of the beast, the enormous bulk of the material—the diseased lungs alone often weighing 30 lbs.—in the majority of cases renders the thorough investigation of all the viscera quite out of the question. Fortunately, in Pleuro-pneumonia this does not seem at all necessary, because the abdominal organs do not present any changes which can be looked upon as either constant or characteristic of the affection.

The nervous centres have never been examined, because it is necessary, the instant the animal is knocked down, to destroy the spinal cord and the brain, so as to prevent the energetic reflex movements of the limbs which would otherwise accompany the skinning, and prove dangerous to the operators.

There are, then, in studying the diseases of the lower animals, many difficulties which balance the one advantage, of which we often hear—namely, that of being able to kill the beast at any time, and thus find out the steps in the morbid changes which correspond to the various stages of the disease. Practically, in the case with which I have to deal, this advantage is but little felt, for there is really no control over the time of slaughter, and there seems a clinical difficulty in ascertaining how long the disease has lasted, so that the exact stage it has reached cannot be known until the animal is killed.

These difficulties doubtless explain the great paucity of scientific literature on this subject, and the complete want of any adequate scientific explanation of the progress of the disease. The following references may suffice to give some idea of the present standpoint of our knowledge of the subject.

* From the *Journal of the Royal Agricultural Society of England.* Part I. 1878.

The first accurate description of the morbid anatomy of Pleuro-pneumonia that I have been able to find, is given by F. Weber,* and, as far as the description of the appearances of the diseased lungs is concerned, this paper has not been surpassed by any since published, that I know of. He calls the disease *Interlobular Pneumonia*, and attempts to explain its development as a form of chronic inflammation of the tissues between the lobules. Though he recognised that there were different kinds of consolidation, he appears only to have submitted one of these varieties to minute investigation, otherwise his clear reasoning would not have led him to the conclusions which he announces in his paper.

He says that examination of the diseased lungs gives two negative results :—

1. There is no trace of croupous exudation in either the large or small bronchi; the mucous membrane in the larger ones is perfectly healthy ; in the smaller tubes a mere trace of catarrhal injection can be detected.

2. In the lung tissue itself the air cells are filled with fluid, as in œdema, and not with solid exudation.

From these results he concludes that the tissue of the lung is in a state of œdema, not hepatisation.

With reference to the starting-point of the disease, he says, "I now pass to the beginning stages, which give the clearest proof that the interlobular connective tissue and the pleura are the real seat of the disease." The other parts, he thinks, become secondarily affected—the exudation causing a kind of strangulation of the lobules, which gives rise to Hyperæmia, Pulmonary Apoplexy, serous infiltration, and (very rarely) hepatisation.

The connective tissue of the lung, then, he considers to be the part affected by the disease, which generally begins under the pleura, but also ocasionally in the deeper interlobular tissue.

He distinguishes two forms of this Interlobular Pneumonia : one widespread and diffuse, extending over an entire lung ; the other, which attacks a small, sharply-bounded part of the lung, like Lobular Pneumonia. These occur with equal frequency, and he expressly states that their difference merely depends on extent and anatomical arrangement, their mode of origin being identical.

Klebs † describes one case in which he found good examples of vascular plugging. He thinks the disease resembles in most respects ordinary Pneumonia, but can be distinguished by the coagulation in the vessels.

Röll ‡ considers that this disease corresponds with the Interstitial Pneumonia of other animals. The first steps, he thinks, occur in the connective tissue, between the lobules, most commonly in the deeper parts of the lung. This tissue becomes congested, and a serous exudation takes place into it, which greatly swells the interlobular spaces. The congested pulmonary parenchyma is thus pressed upon, and ultimately becomes quite airless. The serous fluid more rarely fills the air-cells themselves, and still more unusual is the occurrence in them of the firm exudation of ordinary inflammation. He describes the various secondary lesions which may arise in the course of the disease, and amongst them he mentions bronchial and pleural inflammation.

Bruckmüller § considers the Pleuro-pneumonia of cattle to correspond exactly with ordinary Pneumonia of other animals, the peculiar construction of the lung sufficiently accounting for the peculiarities in the pathological anatomy of the Pneumonia of bovine animals.

* Virchow's Archiv., Bd. vi. p. 89. † Ib., Bd. xxxviii. p. 326.
‡ Lehrbuch d. Pathologie u. Therapie d. Hausthiere. Wien, 1860.
§ Lehrbuch d. Path. Zoötomie. Wien, 1862.

"There is only one form," he says, "of inflammation of the lung in cows, and this is always associated with very striking changes in the interstitial tissue." He describes the disease under the title "Croupous Interstitial Inflammation of the Lung," and he says, "If we compare the pathological products which arise in the lungs of cows affected with Pleuro-pneumonia (*Lungenseuche*) with the products of inflammation of the lungs in other animals, we can find no real difference." He denies its specific nature and its contagiousness, but says it is a good example of an infectious complaint.

The scientific pathology of this disease has not been studied in England with great care or success. The morbid appearances are very easily recognised, and no energy is required to master the anatomical details, since any one can recognise the disease *post mortem*. Therefore the English school has neglected this department of study, having preferred to go into the wider field of theoretical speculation in order to determine the cause of the disease.

Professor Brown,* in an admirable brochure on the subject, gives a very clear sketch of the disease, and well describes the most striking morbid appearances. As to the exact essence of the disease, he says: "Pleuro-pneumonia is essentially determination of blood to the lungs, and exudation of *liquor sanguinis*—that is to say, blood deprived of its red particles—into the connective tissue which is everywhere distributed throughout the lung structure, existing abundantly between the lobules and on the surface of the lungs under the pleural membrane. Exudation occurs also on the surface of the pleura, but the chief deposit takes place under it, and causes its elevation from the lung tissue, just as the exudation between the lobules causes them to separate from each other."

And again he says: "Inspection of those organs of the animal body which are principally implicated in the disease (the lungs), however minute and complete it may be, only puts us in possession of a knowledge of effects. It is evident enough that the lungs have received an excess of blood, and that a large quantity of the circulating fluid has been exuded into the tissue of these organs; but the really important question is, What circumstances conduced to these results? And the only answer which the pathologist can offer is contained in a somewhat vague reference to 'blood poisoning.' As in other contagious diseases, the blood of the animal affected with Pleuro-pneumonia becomes charged with some poisonous material, which is excreted by the vessels of the lungs: for example, in Small-pox the virus is excreted by the skin, and the poison of Cattle Plague by the mucous membrane. In each case it is impossible to define the determining causes. We can no more understand why some of the constituents of the diseased blood are poured out in large quantity in the fibrous tissues of the lungs in Pleuro-pneumonia than we can comprehend the ultimate cause of the distinctive eruptions in the various exanthematous diseases."

Mr. Fleming† says: "Pleuro-pneumonia is a specific and contagious fever peculiar to bovine animals. In its essence it is a malignant fever allied to the general eruptive diseases."

Professor Walley‡ gives an elaborate account of the *post-mortem* changes of Zymotic Pleuro-pneumonia. He divides the progress of the disease into three artificial and rather fanciful chronological stages,—the general characters of the first being "Increase in weight, bulk, and friability; diminution in resilient power, and consequently increased resistance to inflation and decrease in crepitation on pressure; with deepening of colour, and the

* "Observations on the Lung Disease of Cattle known as Pleuro-pneumonia."
† "A Manual of Veterinary Sanitary Science and Police." London, 1875.
‡ *Veterinary Journal*, May, 1876.

presence, occasionally, of ecchymoses or hyperæmic patches in the bronchial mucous membrane, and vascular stellate spots in the parenchyma."

He says: "The general characters of the second stage are—A mottled appearance on section, increase of bulk, density, specific gravity and friability; absolute loss of textural integrity, breaking up of the capillary vessels, and, as a consequence, parenchymal extravasation: obliteration of large vessels and small bronchia, with destruction of the thoracic lymphatic glands."

He thus sums up the characters of his third stage: "Absolute loss of integrity (death), with segregation of the injured lung; hyperplasy of contiguous interlobular tissue; and increased density of the surrounding parenchyma. If the destructive process is arrested, the conditions are: absorption of the red cells, consolidation of the parenchyma, hyperplasy of the interlobular connective tissue, restoration of the circulation, *grey or yellow hepatisation*. In either case the changes in the bronchia and trachea are: ulceration of the mucous membrane, and consolidation of the submucous and extratubular exudate."

As as outline of its general pathology, he says: "We are justified in concluding that Zymotic Pleuro-pneumonia is a distinct and specific infection, and that, although the structures which have been injured by the localisation of its lesions secondarily (unless dead) undergo inflammatory changes, primarily the disease is a purely effusive one (*i.e.*, in the initial stage, effusion—simply and purely—is the characteristic lesion); in the second and third stage, passive are accompanied, and finally succeeded, by active processes; and, in the subsequent changes, inflammatory processes alone go on."

The French definition of the disease is much the same. The most recent authority says: * "By this name (Peripneumonie Contagieuse) is designated a virulent and contagious general affection, confined to bovine beasts; it is of epizoötic character, and is accompanied in ordinary cases by local manifestations in the lungs and pleura, and by a fibrino-serous exudation into the interlobular connective tissue and the pleural cavity,—an exudation which has been erroneously regarded as inflammatory."

Normal Anatomy.

In some points the structural arrangement in the lung of the ox is sufficiently peculiar to demand a short notice—the more so since the peculiarities have, I believe, a very direct bearing on the mode of commencement and progress, as well as the pathological characteristics of the disease.

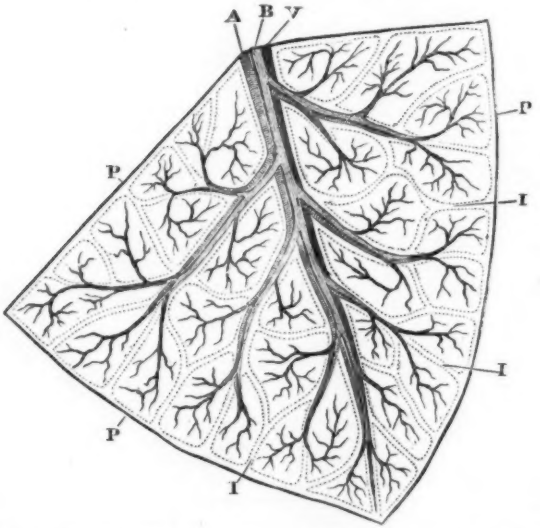
The regional anatomy appears to be interesting only from a clinical point of view, showing, as it does, how difficult, if not impossible, it must be to recognise pneumonic consolidation when the disease is localised to the anterior lobes, which are completely walled off from physical examination by the dense mass of solid parts forming the shoulder of the beast.

The number of lobes, and their complete separation one from the other by means of deep fissures, may tend to keep the disease isolated, but otherwise the descriptive anatomy teaches us little. In the larger air-passages the mode of subdivision is irregular, being seldom fork-like, as in the human lung. The trachea itself does not bifurcate until it has given off a large separate branch to the right anterior lobe. The lobar bronchi give off small lateral branches, as they run down sometimes beneath the pleura of the long slender lobes, and do not divide dichotomously. The mode of branching, however, is found to differ materially in different lobes, and appears to depend on their size and shape—those of the large posterior lobe dividing more like the air-passages of the human lung.

* "Dictionnaire de Méd. Vétérinaire," t. iii. p. 74. Paris, 1877.

The bloodvessels follow the course and mode of branching of the air tubes; the artery and the vein lying on either side of their corresponding bronchus. In the healthy lung the vessels and bronchi are surrounded by a quantity of very delicate connective tissue, which forms around them a loose sheath common to the three, so as to separate them from the lung parenchyma. Any, or all, of the vessels may be pulled out of this yielding case of soft cobweb-like tissue; and the delicate structures may be torn from their proper coats, with which they are thus seen to be directly continuous. The bronchus, artery, and vein contained in this sheath may be conveniently referred to under the name *broncho-vascular system*, while the region of lung-tissue supplied by any such system may be called *broncho-vascular territory* (Fig. 1).

FIG. 1.—Showing the Distribution of a Broncho-vascular System and the corresponding Territory of part of a Lobe.



A. Artery. B. Bronchus. V. Vein. P. Pleura. I. Interlobular spaces. The dotted lines indicate the course of the lymphatics. (Semi-diagraphic. Reduced one-half.)

If a thin injection-mass be thrown, with gentle and steady pressure, into the interstices of this peribronchial tissue, it gradually runs along the outer surface of the bronchus and vessels, and permeates into all parts of the connective-tissue sheath. Thus may be demonstrated the existence of a close network made up of an immense number of delicate, irregularly sinuous, or lacunar lymph-channels, which completely encompass the artery and vein, and form around them a sheath of lymphatic anastomoses.

In the very small bronchial tubes which belong to the single lobules the mode of branching changes and becomes dichotomous, and the branches lie

at right angles to each other. Within the lobules, the tubes and vessels have no longer the same sheath of connective tissues, and I have failed to satisfy myself of the existence of any lymphatic vessels around the bronchus in this situation. If such exist, they must play a very insignificant part in draining the tissue, compared with that taken by the numerous channels in the sheath of the larger broncho-vascular systems.

With regard to the construction of the parenchyma of the lung, there are also some peculiarities which deserve special note, as they distinguish the lung of the ox from that of most other animals. In the bovine tribe a state of affairs persists throughout adult life, which is found only in the early stages of the development of the lung of man. The lobules, or ultimate component parts, are distinct from each other, and may be regarded as independent lung units, each having its own proper air-tube and bloodvessels, and being connected to its neighbours only by some very delicate connective tissue. This connection can be stretched, by a little gentle traction, so as to make the partition between the lobules an eighth of an inch in width. A little more forcible traction, aided by occasional touches of a scalpel, tears through this delicate tissue; so that, with a little care, the lobules may be completely separated from each other, without their tissue suffering the least injury. They are thus left hanging from the large bronchus, by means of their own proper broncho-vascular systems, just as raisins hang from the parent stalk. If they be now partially inflated, each lobule is seen to be a soft, irregularly-shaped body, about the size of a filbert nut. On the pleural surface the outlines of the lobules can be seen to be polygonal areas with definite boundaries. The spaces between the lobules are occasionally made more prominent by means of little chains of air blebs, which lie in them. This seems a common pathological condition in cattle, being a form of true Interlobular Emphysema, which can also be easily produced after death by means of forcible inflation.

When the delicate connective tissue, which forms at the same time the partition and connection between the lobules, is broken through, each lobule may be seen to be enveloped in a case of this loose tissue. This can be traced to the point of entrance of the vessels, where it is found to be continuous with the tissue of the loose sheath already described as surrounding the broncho-vascular system.

Careful investigation of the fine interlobular connective tissue shows it to be the seat of a very rich plexus of lymph-channels. Here and there vessels with an even outline and wall are seen, but it is more common to find, lying throughout the tissue, wide, sacculated, and irregular passages, freely intercommunicating one with the other. This plexus of lymph-vessels lies midway between two adjacent lobules, and evidently carries some of the lymph overflow from each of them, their lymph-channels being thus intimately related.

By blowing air into an interlobular space, a number of the neighbouring spaces may be inflated, and thus artificial Emphysema produced. The relations of these parts can, however, be much better seen by means of injection. A thin coloured solution may readily be made to run through the lymph-channels, and will be found to spread from one interlobular space to those immediately adjacent; and thence it will pass along the lymphatic channels of the corresponding broncho-vascular system already mentioned. Thus, from a single point of insertion under the pleura, not only can more than one interlobular space be injected, but also the injection finds its way along the lymph track, and reaches the main routes leading towards the root of the lung.

A rich set of lymph-channels may be seen beneath the pleura, being best marked over the interlobular spaces. Though at first it appears distinct,

this lymph plexus is intimately connected with those of the interlobular spaces, and may be regarded as a part of the same general system. That wonderfully rich set of lymphatics, with which one is familiar in the sub-pleural tissue of many animals, does not appear to be so well developed in the ox. In comparison, at least, with those around the bronchi and vessels, the sub-pleural lymphatics are small. It seems probable that in the case of the ox the deep channels which accompany the bloodvessels take the place of the lymphatic high-roads which exist under the pleura of many animals.

The following points concerning the normal anatomy may be thus briefly recapitulated :—

1. The vascular and bronchial territories are distinctly defined and independent of one another.
2. The lobules of the lung in the ox are quite distinct, and may be separated without injuring their air-cells.
3. Each lobule is enveloped in a loose case of connective tissue, which contains a rich plexus of lymphatics.
4. A sheath of delicate connective tissue also surrounds the *broncho-vascular systems*, and forms the bed of large lymph-channels.
5. The lymph from the interlobular spaces passes along the peri-bronchial passages.
6. As the lymph-vessels follow the course of the broncho-vascular systems, those around any given system must drain the territory of the lung tissue supplied by that system.
7. The sub-pleural lymphatics seem to take a less important share in draining the tissue than is the case in many other animals.

Morbid Anatomy.

There are few diseases in which the *post-mortem* appearances are more characteristic than in Pleuro-pneumonia. So distinct are the characters of the advanced stages of the disease, that the most unscientific eye can recognise it after seeing a few cases. The group of morbid changes is very constant ; and, moreover, there is a general character which is so peculiar as to be easily recognised in every stage of the disease, and which has therefore been deemed specifically diagnostic of it. To the butcher, Pleuro-pneumonia presents a much more simple field for speculation than it does to the pathologist, who recognises a number of different morbid changes, which seem to depend on very different causes.

Morbid processes occur in the pleura, in the lung parenchyma, and in the bronchial tubes and bloodvessels. It appears convenient to discuss the changes in each of these parts separately, in the order named, this being also the order in which they are met with in the *post-mortem* examination.

Pleural Lesion.—The changes in the pleura show the ordinary signs of Pleurisy of rather acute type, in some one or other of its many phases. There is nothing definitively characteristic in the anatomical changes in the pleural cavity to distinguish this from the other forms of pleural inflammation, from whatever cause they may arise. The only point of peculiarity which seems constant in this disease of the pleura is its tendency to remain localised, although the inflammation is intense. In Acute Pleuritis, the inflammation is usually diffused very evenly over the entire organ, but here are found very different degrees of pathological change in different parts of the same pleura, the inflammatory action being always more intensely marked in some one part than over the general surface of the lung. This focus of great intensity is usually well seen even in old cases, for at this point the pleura is found to be covered with dense fibrinous exudation, the deeper layers of which are often stained with blood. This is invariably found to cover the point where

the lung lesion is most advanced in its development. As the disease spreads the contiguous lobes become firmly cemented together by the adhesion of their pleural surfaces. Adhesions may also occur between the visceral and parietal layers of the pleura, but it is more common to find them widely separated by a quantity of fluid effusion. The amount of disease found on the parietal pleura is, commonly, strikingly slight, when compared to that of the pleura covering the lung.

Every variety of exudation may occur, and often a number of different kinds are met with in the same pleural cavity. Most commonly the surface of some one part is coated over with soft, spongy, friable, or semi-gelatinous material, while in other parts the pleura may only be thickened or opaque. Now and then dense fibrinous masses may cause firm adhesions; but the animals are seldom allowed to live long enough for that to take place.

The effusion contained in the cavity of the pleura is generally a thin yellowish, or greenish, whey-like fluid, containing flocculent masses or shreds of fibrinous material. It forms a soft coagulum soon after removal. Sometimes it is quite clear, but more commonly it is turbid or opalescent. I have not met with a case where the pleural cavity contained pus. The amount of the fluid is sometimes very great—filling the greater part of the chest, compressing the lung, and displacing the neighbouring viscera. I have seen quarts escape when the breast-bone was split, and on looking into the chest it still appeared to be quite full of fluid.

When the anterior lobes are the seat of the disease, and the pleura covering them is intensely affected, the neighbouring pericardium is often inflamed, its fibrous layer thickened, and the serous lining rough, and studded with small points of ecchymosis.

As the name Pleuro-pneumonia implies, the inflammation of the pleura is a very constant part of this disease. It occurs with great regularity, and, on account of the striking characters of the lesions it causes, it is never overlooked even by the most careless observer. Cases do occur, however, where the pleura is not affected at all. I met one such by accident when studying the normal anatomy of the bovine lung.*

In this case there was not the least sign of even thickening of the pleura, while the lung disease was well marked.

This is the only case I have met with in which there was no trace whatever of Pleurisy. I am informed, however, that it is not uncommon to find nodules of disease in the lungs of fat cattle, even where there has not been the least suspicion of disease before death, and no sign of pleural disease at all.

In three cases, where there were several points of disease in different parts of the lung, the pleura covering some of them was found to be perfectly healthy. Thus in one case there was extensive disease of the left lung and pleura, and in the right lung there were three isolated nodules, the largest about the size of a cricket-ball; and yet there was not a trace of pleural disease on that side, and nothing could be more definite than the specific characters of the diseased points of lung tissue.

It would appear, then, that Pleurisy does not invariably accompany the disease of the lung tissue; but when the diseased focus is small and deep-

* I took from the slaughterhouse a lobe of a lung as a sample of healthy tissue. It was taken from a very fine well-fattened, young bullock, which was not suspected, before or after slaughter, to have had anything the matter with it. The pleural surface of both lungs was perfectly healthy throughout, and retained its transparency and natural shining surface. On examining the deeper parts of this lobe, a small focus of well-marked pleuro-pneumonic consolidation was found, surrounded by a considerable area of tissue which was the seat of clear exudation. A piece cut off from the part of this lung I had removed was examined by Prof. Brown, and he considered the microscopic characters of the disease to be well marked.

seated, the serous membrane may escape. As a general rule, however, the *post-mortem* examination of the disease is not made in the earliest stage, for the lung lesion may easily be overlooked, and it may remain latent for an indefinite time, and therefore its duration does not at all correspond to the clinical history of the disease, which generally dates from the pleural complication.

With regard to the lesion of the pleura, I feel convinced of the following points :—

1. It has the characters common to the ordinary forms of Acute Pleurisy.
2. It always varies in degree of severity in different parts of the same pleura.
3. Its point of greatest intensity corresponds to the apparent starting-point of the lung lesion.
4. It is not an invariable or essential part of the disease.
5. It usually appears to be of more acute type and more recent development than the lung lesion.
6. Its occurrence often gives the first indication of the existence of disease.

Lung Lesion.—The situation of the disease in the lung is generally obvious, on account of the pleural inflammation being more intense over that point. When the Pleurisy is absent, or is too diffused to indicate the exact position of the affected part, it can still be easily recognised as a hard, heavy, airless, and discoloured mass, standing out boldly from the neighbouring normally collapsed lung tissue, which is soft, light, and elastic.

The extent to which the organs may be affected varies greatly—the size of the diseased area being, as a general rule, in direct proportion to the length of time the disease has lasted. Sometimes the greater part of both lungs appears to be implicated, while in others there may only be a nodule the size of a man's fist. When looking at the lungs after removal, one is apt to think that a greater proportion of them is affected than is really the case ; because the diseased part seems to have greater relative bulk, when compared with the healthy structure, than it has in reality ; for this latter collapses into very insignificant dimensions when the thorax is opened, while the size of the diseased portions remain unaltered. The correct proportion of healthy and morbid parts can only be seen when the organs are inflated, by which means the healthy parts are distended to their normal size. At first sight I have often felt inclined to say that the whole of one lung was engaged, so enormous was the hard mass and so general the Pleurisy ; but inflation brought out many considerable tracts of healthy lung tissue, which would have escaped notice had they not been thus distended with air. In these cases, where the whole of a lung seems diseased, much of the airless part presents on section none of the distinctive characters of Pleuro-pneumonia, but merely those which are due to pressure, or such-like secondary changes.

Under the present system of slaughter the disease never seems to reach the extreme stages which have been described by some authors, where the lungs weigh over 100 lbs. As a general rule, the morbid processes, which are characteristic of the disease, are limited to a comparatively small area, seldom engaging more than half the lung, and most commonly only one lobe. Where many lobes are diseased, they are found to be affected in different degrees, there being usually a central focus, in which the pathological processes appear in a more advanced stage of development.

When the lung is distended with air, so as to assume its normal size and shape, and give an accurate cast of the cavity of the chest, it becomes obvious that the diseased part is not only densely solid, but that it is also considerably swollen ; the increase in size being much more than could be brought about by the forcible inflation of a similar part of healthy tissue. It

is also changed in shape, its flat surfaces having become convex, so that the diseased mass projects above the surface-level of the inflated lung as a rounded swelling, distorting the neighbouring lobes and pushing them from their natural position.

If a section be made through the centre of the affected part, by cutting from the surface towards the root of the lung, the broadest side of the lesion is always at the pleural surface, and the narrowest points towards the root of the lung. This tapering off towards the entrance of the broncho-vascular system is very well seen in the less advanced cases, where the disease is localised to an area with a distinct conical outline. The base of this cone looks towards the pleural surface, and its apex inclines to the root of the lung, at which point it is found to correspond to the broncho-vascular system supplying this region. In some instances this wedge of disease is found accurately to correspond to one of the broncho-vascular territories which have already been mentioned. In the advanced stages of the disease this conical outline is generally lost, owing to the swelling, which rounds off the corners, and also to the irregular spread of the lesion by means of the pleura.

The disease is often localised to one lung—the right apparently a little more frequently than the left; but it is also often found in both, one generally being much more diseased than the other. Sometimes two or more distinct foci of morbid change may exist, apparently without any connection, there being a broad piece of healthy lung tissue between them.

In the earlier stages of the disease, the boundary of the lesion of the lung is definitely marked and accurately circumscribed. The line of demarcation in these cases always corresponds to the interlobular spaces, all the lobules supplied by a certain set of vessels being engaged, while their immediate neighbours may be perfectly free. The sharp lines of demarcation, not only between the healthy and diseased structure, but also between the different territories affected with the various degrees of morbid change, are amongst the most striking and constant characters of anatomical appearances.

Although the consolidation which is met with in this disease has much in common with that which is brought about by other causes, it differs materially from the hepatisation caused by ordinary Pneumonia in man, and these differences form its chief diagnostic characters. The dense solidity is seldom accompanied by any friability of the tissue, but is resisting and elastic, except in those parts where the tissue is undergoing necrosis. Such circumscribed localisation and boss-like swelling only occur, as far as I know, in this disease and in malignant growths. The manner in which the different changes in colour are distributed forms another striking characteristic. There never is any gradual shading of one colour into another, as seen in the Acute Pneumonia of the human lung, but the different shades are placed side by side, being separated by the most abrupt lines. The greatest possible varieties of shade may be seen irregularly distributed in patches of various sizes; here and there a dull buff colour, or a bright crimson, mixed with deep brown or black. The normal pale pink colour of the lung is always lost, being replaced by some of the above shades, often arranged so as to produce a variegated or mottled appearance of the cut surface; or a large black area may exist in the centre of the section through the diseased lobe, and this is commonly surrounded by patches of brown or buff.

Perhaps the most striking appearance seen on the cut surface is the network of pale yellow lines which is distributed over it. The lines forming this network are, on an average, about one-eighth of an inch in diameter, always very pale, and sharply defined. They intersect and cross one another, so as to map out the surface into a number of polygonal areas, about half or three-quarters of an inch in diameter. These areas are found to correspond with

seated, the serous membrane may escape. As a general rule, however, the *post-mortem* examination of the disease is not made in the earliest stage, for the lung lesion may easily be overlooked, and it may remain latent for an indefinite time, and therefore its duration does not at all correspond to the clinical history of the disease, which generally dates from the pleural complication.

With regard to the lesion of the pleura, I feel convinced of the following points :—

1. It has the characters common to the ordinary forms of Acute Pleurisy.
2. It always varies in degree of severity in different parts of the same pleura.
3. Its point of greatest intensity corresponds to the apparent starting-point of the lung lesion.
4. It is not an invariable or essential part of the disease.
5. It usually appears to be of more acute type and more recent development than the lung lesion.
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the sections of the lobules, and the pale lines are obviously the swollen interlobular spaces cut across, the narrow lines which exist in the healthy lung between the lobules being represented by masses of more or less solid exudation, so as to give a cross-section of more than an eighth of an inch. This set of pale streaks, crossing the surface in many directions, reminds one of the whitish veins running through variegated marble; and hence the common name which has been applied to the appearance of the section of the lung lesion. This "marbling" is considered to be the great diagnostic character of this disease.

When examined more closely, the increase in diameter of the interlobular partitions is found to depend on extreme filling of the tissue interstices and lymph channels with a material which may be a clear fluid or a translucent jelly; or, in the very advanced stages, a dense fibrinous mass may occupy the entire space.

In every case there are to be seen different shades of this marbling, which correspond to different stages in the disease, or are quite distinct morbid processes. I think it will simplify the description of the morbid anatomy of the lung, and render the steps in the progress of the disease more easily understood, if these various forms of pathological change be considered separately.

Clear Exudation.—The first which I shall mention may be called simply exudation, or the infiltration of the tissues with a clear material. This condition is generally found in the periphery of the diseased region, and forms a very complete case, enclosing the dense forms of consolidation to be described hereafter. This can be particularly well seen where but a small nodule exists. Thus, in one case, where only three lobules were in an advanced state of disease, all the lobules lying in immediate apposition to them were in a condition of pale œdematous-like thickening. When a great extent of the lung is engaged, the boundary of this transparent exudation is irregular and badly defined; but when a limited area only is affected, its margin is sharply marked, and corresponds to the lines separating the lobules.

There seems to be no increase in the amount of blood in the lung in this condition. On the contrary, the bloodvessels appear for the most part empty, and the tissue anæmic. The pink colour is replaced by a pale yellow, or dull buff, and at the same time the tissue gets a peculiar semi-translucent look. A clear fluid escapes from the cut surface. This is often mixed with a little frothy fluid, but as a rule the tissue seems quite airless, and does not crepitate. The interlobular spaces are filled with a clear fluid, which widely distends the interstices of the delicate connective tissue. Except in the cases where the disease is very limited, the part filled with clear exudation does not appear to have any very definite shape, as it easily spreads beyond the limits of the broncho-vascular territories, passing from one interlobular space to another. When the pleural inflammation is very intense, some of the lung tissue situated immediately under it is affected with this infiltration, but it seldom reaches to a depth of more than an inch or so from the pleural surface. This mode of extension of the exudation, under the inflamed pleura, is of great importance, as it causes destruction of a large part of the lung, and seems to spread the disease with great rapidity over an extensive area of the organ, giving rise to those cases where nearly the entire lung is implicated.

A great variety of intensity of this exudation exists. The tissue appears at first to be soft and spongy; the air is then gradually diminished, and the part becomes brawny and tough. Although the line of demarcation is often very distinct between this clear exudation and perfect consolidation, there are so many degrees of the former, that it seems capable of passing into more dense forms of induration, and it is difficult to find any characteristic

which would serve to distinguish all grades of this change from that about to be described; but, as will be seen, the two must be kept quite distinct. The more dense the affected parts the more perfectly marked is the exudation into the interlobular spaces, and therefore the more perfect is the development of the marbling.

The microscopic examination of this translucent spongy kind of condensation of the lung tissue shows that, in the earlier stages, there is but little change in the characters of the tissue-elements. The cavities of the air-cells are filled with a material which is obviously recently clotted serous exudation. It consists of delicate threads of fibrin and a few granular corpuscles. The fibrin threads are variously knotted and granular, and appear to radiate from the corpuscles. The very same kind of material is found to fill the lymph-passages of the interlobular spaces, and the small bronchioles contain some similar fibrinous fluid. The network of capillary vessels around the air vesicles is quite empty of blood, and therefore cannot be well seen in this stage of the disease. The number of cell elements differs very much in different cases. They are chiefly, to all appearance, ordinary white blood corpuscles. In the cases where the exudation is more abundant, however, there is also a number of cells, which are much larger and more granular, and in the midst of them a very distinct nucleus is obvious. The more solid and brawny the tissue, the more numerous these large coarsely granular cells are found to be, and the more thick-set is the network formed of the granular threads of fibrin. In the denser forms of disease the epithelium lining the alveoli appears to be changed. The cells are granular and thick, and their nucleus becomes prominent; so that the cells, which in the normal lung are so very difficult to see, become so obvious as to attract the attention of the most thoughtless observer.

Opaque Consolidation.—The kind of induration next to be noticed may, as I have already said, closely resemble the result of a long-continued state of the clear exudation just described, which seems gradually to pass through a series of changes, each being more dense than the preceding, until a condition is arrived at which deserves the name of perfect consolidation. But this is not to be confounded with what I call opaque consolidation, from which it differs in its mode of origin, its development not being preceded by the last-described infiltration. It is invariably less resilient, and is more granular in appearance. In the earliest stages of the disease the two forms of lesion can be easily distinguished one from the other.

This opaque condition is always more vascular than the clear exudation, but cannot be said to be much engorged, although here and there the blood-vessels are more or less distended with blood, so as to give the tissue a bright reddish-brown colour. This is the exception rather than the rule, for the usual colour of the section-surface is a pale brownish-red. The parenchyma is not at all translucent, the tissue being quite opaque as well as solid. The spaces between the lobules are densely filled with an opaque dry exudation, which in places can be turned out of the lymph-vessels, as distinct casts of their internal conformation. The air vesicles are filled with a somewhat similar material, which, under the microscope, proves to be composed of great numbers of cells, entangled in a dense felt-work of delicate granular fibrin threads, united into a dense solid mass. The swelling of the entire part is much greater than in the translucent form, and the spaces between the lobules are much more distended; at the same time they retain their pale straw-colour, and form the striking system of markings seen in the "marbling."

Every part of this true consolidation is hard, heavy, and resisting, but not so elastic as the parts which are translucent and soft. In a few instances the tissue has been found to be friable, apparently from a tendency to

necrosis, caused by want of nutrition, the bloodvessels being pressed upon by the swelling. This is an exceptional case, however; for, as a general rule, the nutrition of the part is not at all interfered with, and the tissue not only retains its firmness, but continues to become more and more solid, until an almost cartilaginous consistence is attained. The bronchial arteries supply the nutrition, and are much enlarged. This induration is associated with a distinct increase of the tissue elements, of the connective-tissue septæ between the lobules, and also of the tissue of the lobules themselves. In some cases, where the animal has been allowed to live a long time, he fibrous thickening of the interlobular spaces increases to such a degree, that the lobules are greatly encroached upon, and the vesicular tissue becomes so altered that the lung parenchyma can hardly be recognised. In this stage which is now rarely met with, the animal being slaughtered when first the disease is recognised, the lung is nearly as dense as fibro-cartilage, creaking under the edge of the knife like gristle. Most of the smaller bronchi are obliterated, and even tubes which should normally admit the little finger have been found closed and impervious, their existence only being recognised by the cartilage of their wall remaining unaltered amidst the dense, fibrous tissue in which they lie. The small bronchi are all plugged in this condition, while in the translucent form they are all free and pervious.

This kind of indurated tissue is always pale and bloodless. The pulmonary vessels are usually closed by pressure, but the nutrition of the part seems amply provided for by the bronchial vessels, which are more obvious than they become in the later stages. In many parts thus indurated, the lobular tissue may retain a certain amount of vascularity, its colour then contrasting most strikingly with the thick interlobular spaces, which are white and glistening.

This fibroid change reminds one of the condition of the human lung in the very advanced stage of Interstitial Pneumonia which has been called Cirrhosis. It differs, however, from that in a very essential point—namely, that there appears no tendency to contraction of the fibroid tissue, such as is found in Cirrhosis, causing shrinking of the lung and dilatation of the bronchi, etc. On the other hand, in the fibroid consolidation of Pleuro-pneumonia, the infected part invariably seems to be increased in size. It is certainly possible that, if life continued long enough, the shrinking might take place; for the contracted state known as Cirrhosis only occurs as the ultimate result of old Interstitial Pneumonia.

Microscopic examination of the different stages of this consolidation shows various gradations in the exudation material. From being a fibrinous mass packed with cells, it changes to a kind of cicatricial tissue. The capillary vessels are frequently found to be filled with blood-corpuscles. The bronchioles and air vesicles contain masses of different kinds of cells, some small, round, and pale, but the majority large, and coarsely granular.

In a few cases, peculiar small bodies were found in the cavity of the air vesicles. In certain parts they were so numerous that two or three came into the same field of the low power (Hartnack, Obj. No. 4). They were most strikingly regular in size, measuring about $\frac{1}{500}$ of an inch in diameter. Their shape was nearly spherical, or very slightly oval. In structure they appeared to be made up of small rods very closely set together, and radiating from the centre of the body. They resisted the action of the strongest reagents, even such as completely destroyed every trace of the lung tissue: in fact, everything seemed to make them darker and more distinct. They are crystals of tyrosin, but they do not respond to the tests for that substance.

The exact nature of these bodies I have not been able to determine, but, from the rarity of their occurrence, I have come to the conclusion that

they cannot be said to have any important bearing on the pathology of the disease.

Black Consolidation.—The third form of consolidation to which I wish to call attention is generally found in well-developed cases of Pleuro-pneumonia, though it is more frequently wanting from either of the preceding forms. Its appearance contrasts most strikingly with the changes hitheto mentioned, and it appears to differ from them also in its mode of production. It is at once distinguished from all other kinds of morbid change by its colour, which looks nearly black, so intensely dark is the red of the lobular tissue. From its cut surface a deep red fluid escapes, which stains all the paler structures dark crimson.

The shape of this form of lesion is always that of a distinct cone, the apex of which points to the root of the lung, and its base to the pleura. Its boundary is invariably sharply marked off from the neighbouring diseased tissue, in the midst of which this dark part always lies. The lobular tissue is the only part which has the dark colour, the interlobular spaces being as pale as in the other forms of consolidation. The pale yellow of the interlobular spaces is exceedingly striking in this black part, and also forms a clear trenchant boundary to it. It is easy to satisfy oneself that the extent of this lesion corresponds accurately to that of a vascular territory. Sometimes an entire district supplied by a good-sized vessel is in this condition. In other cases several small territories are engorged, in which case they commonly all belong to the one district which receives its blood supply from the same main branch.

The extent of this lesion is seldom so great as that of either of those already described, but its weight and density exceed those of any other form. The amount of swelling which accompanies it is also very great, so that when a very prominent knob projects over the surface of the lung, and is covered with very intense pleurisy, one may safely predict that, on section, it will prove to be the base of a cone of this black marbling. It is invariably associated with very intense and acute pleurisy, which often gives one the impression of having commenced at this point, and spread thence over the serous membrane.

The microscope shows the minutest vessels of the tissue to be intensely engorged. Even in those parts where the blackness has not reached its height, all the bloodvessels are tightly packed with blood-discs, which are so pressed together as to form a continuous line of facetted corpuscles looking like a solid injection. The fluid part of the blood seems to have escaped from the vessels and left the solid parts alone in the swollen and tortuous capillaries. In the very black part, engorgement does not adequately express the state of affairs. Here the vessels have given way, and the blood-discs have escaped and filled every available corner of the air vesicles. The larger bloodvessels are also filled with plugs of clotted blood, which adhere to their walls.

This form of black consolidation, which obviously is the condition known as hæmorrhagic infarction, is never found alone ; it is always associated with, and preceded by, the other lesions, which seem to be of much longer standing.

Like the other morbid changes, this appears to pass through a series of stages, which depend on the changes taking place in the effused blood and in the nutrition of the tissue. The first step must occur with great rapidity, for one never meets with any initial state of hyperæmia. Where the lesion has lasted for some time, the tissue is found to have lost its elastic toughness, and become hard, dry, and friable, and at the same time its colour has faded to a dull brown. The friability of the part may increase, so as to form a dry crumbling mass, which ultimately undergoes caseous degeneration. In

other cases the death of the tissue occurs more suddenly, and the part becomes gangrenous. The dead tissue may be surrounded with a kind of fibrous case, so as to remain shut off from the neighbouring parts. Sometimes this completely separates, and remains in the chest as a cyst, containing a mass of cheesy degeneration. These cases only occur where the cure of disease has been attempted, instead of the animal being slaughtered.

To sum up the more important of the foregoing facts.

1. The lung parenchyma is usually the seat of various forms of irregularly arranged exudation, which gives it a mottled look.

2. The interlobular spaces are always the seat of more or less exudation, which gives their sections the appearance of pale yellowish lines.

3. These pale lines subdivide the mottled surface into irregular small fields, and thus give the effect which is deemed so characteristic —*marbling*.

4. Three kinds of lesion must be distinguished in the lung.

   (*a*) A more or less fluid exudation, making the parenchyma airless, though soft and translucent; this is diffused superficially, and wide-spread.

   (*b*) A dense, opaque consolidation, which is generally the central focus of disease, and is wedge-shaped and defined.

   (*c*) Black consolidation—hæmorrhagic infarction.

5. (*a*) or (*b*) May pass into consolidation of a dense kind, and ultimately form tissue of cicatricial hardness.

6. (*c*) May produce gangrene, caseous degeneration, or fibrinous crumbling.

(*To be continued.*)

DOCKING HORSES' TAILS.

THE cruel and depraved fancy for having horses "docked" short is again coming into fashion, and veterinary surgeons are certain to be requested to perform this unnecessary and painful amputation. For many years a number of persons have set their faces against this whim, and class "docking" with the "cropping" of dogs' ears, "dubbing" fowls, and other barbarous practices for which there is no necessity. That magistrates may take this view of the operation is not improbable; and it is, therefore, as a warning, that we draw attention to the fact, that recently, at the Bow Street police court, Sir James Ingham, in a case in which a man was tried for cruelty in working a horse with its tail mutilated in this manner, said it had been wisely determined to make the cruel practice a *Criminal Offence*, and fined the defendant heavily.

Reviews.

THE NATURE AND TREATMENT OF RABIES OR HYDROPHOBIA. London: Baillière, Tindall, and Cox, 1878.

This work is the report of a special commission appointed by the *Medical Press and Circular*, and is designed to afford the maximum amount of information relating to this terrifying malady in a minimum of space. In 282 pages we find pretty well everything known of the disease and the sanitary measures necessary to control its extension; and though there is nothing very much in the way of novelty in its

chapters, yet the book contains a wonderful collection of facts and observations which possess great value, especially with regard to the pathology and symptomatology of Hydrophobia. To the recent alarming prevalence of Rabies, and the comparatively large mortality from Hydrophobia, is due the appearance of this report—a study of which we recommend to the members of the veterinary profession. It generously acknowledges the labours of veterinarians in this direction, and insists upon the necessity for recognising the claims of comparative pathology as an important section of medical science. At page 272, for instance, we find the following :—"In concluding our report, we must draw the attention of the profession to one important subject. Rabies illustrates the close connexion existing between human and veterinary medicine. Our knowledge of Rabies would have been limited, but for the researches of such veterinarians as Blaine, Youatt, Bouley, Pillwax, Bollinger, and Fleming; and society and humanity in general owe a debt of gratitude to the sister profession for the labours which have furnished our profession with the groundwork upon which all our knowledge is based. Human pathology cannot be divorced from its twin sister, comparative pathology, and we thoroughly agree with the aspiration of Fleming, that it is to be sincerely hoped both branches of medical science may be ultimately looked upon as one, and that the benefits to humanity to be derived from their union may be fully realised. Veterinary medicine has of late years occupied a larger share, both of the attention of the public and of the Government."

We gratefully recognise this acknowledgment, and feel assured that it will be as heartily appreciated by our colleagues and fellow-labourers.

VETERINARY MEDICINES; THEIR ACTIONS AND USES. (Fifth Edition.) By Finlay Dun. Edinburgh: David Douglas, 1878.

The popularity and utility of Mr. Dun's text-book is sufficiently demonstrated by the large demands which have been made for it—no fewer than five editions having been called for since it was first published, in 1854. This sale is the strongest evidence of the estimation in which the work is held by veterinary students and practitioners, and renders it unnecessary for us to say more of the new edition just issued, than that it is still the best work of the kind in our language. Some alterations have been made with advantage, several new drugs are brought to notice, and all information pertaining to the subject is given in the clearest manner and the most convenient form.

RIDING RECOLLECTIONS. (Second Edition.) By G. J. Whyte-Melville. London: Chapman and Hall, 1878.

There is no one in the ranks of literature more competent to write on horses and hunting, than Whyte-Melville. As a high-class novelist, his name is well known to the novel-reading public; as a good man "across country," his name and his presence have been, and are, familiar in more than one hunting shire. We do not know that he has ever written anything which could be more attractive and instructive

than his "Riding Recollections," a second edition of which has been called for only a few months after the first was issued. The members of the veterinary profession are, as a rule, patrons of field sports, and particularly of hunting; and we have reason to know that not a few of them are recognised as "good," "bold," or "skilful" riders. Their vocation brings them into close contact with horsemen; many of them have adopted veterinary medicine from their love for the horse; while the practice of their calling enables them to cultivate that knowledge of the noble animal which comprises those special characteristics that distinguish it in health, no less than its peculiar symptoms and idiosyncracies when suffering from disease. To all those, therefore, Whyte-Melville's "Recollections" must prove particularly attractive. He writes with a full knowledge of his subject, and a large experience of horses and their nature, as well as their diversities; no less than of the qualifications required by those who ride *to* or *at* hounds. The anecdotes are good and telling, and the style is eminently attractive, as might be inferred by those who are acquainted with his other works. We have chapters on kindness, coercion, the use of the bridle, the abuse of the spur, the hand, seat, etc. Those who have studied animals and animal management will readily concur with the following sensible remarks, which commence the first chapter:—"In our dealings with the brute creation, it cannot be too much insisted on that mutual confidence is only to be established by mutual good-will. The perceptions of the beast must be raised to their highest standard; and there is no such enemy to intelligence as fear. Reward should be as the daily food it eats, punishment as the medicine administered on rare occasions, unwillingly, and but when absolute necessity demands. The horse is, of all domestic animals, most susceptible to anything like discomfort or ill-usage. Its nervous system, sensitive and highly strung, is capable of daring effort under excitement, but collapses utterly in any new and strange situation, as if paralysed by apprehensions of the unknown."

We have read Whyte-Melville's book with the greatest degree of pleasure, and feel sure that all who are interested in riding and hunting will agree that nothing better of its kind has appeared for many a day. The illustrations by Giberne are excellent in their way.

Abstract of the Proceedings of the Royal College of Veterinary Surgeons, Veterinary Medical Societies, etc.

ROYAL COLLEGE OF VETERINARY SURGEONS.

SPECIAL MEETING OF COUNCIL, HELD JUNE 4TH, 1878.

Present—General Sir Frederick Fitzwygram, Bart.; Professor Simonds; Messrs. Balls, Batt, Blakeway, Broad, Cartledge, Collins, Cox, Cuthbert, Dray, Freeman, Greaves, Harpley, Morgan, Proctor, Reynolds, Taylor, and the Secretary.

On the motion of Mr. DRAY, General Sir F. Fitzwygram was voted to the chair.
The SECRETARY read the notice convening the meeting.
The minutes of the previous meeting were read and confirmed.

Election of President.

Mr. DRAY said it gave him much pleasure to have the honour of once more proposing that General Sir Frederick Fitzwygram be again elected President. To expatiate upon the estimable services which Sir Frederick had so cheerfully and unselfishly rendered during the last three years in his capacity as President, would be a work of supererogation, as these services were patent to all. There were many reasons why Sir Frederick should be solicited to resume the office of President. There was an agitation on foot to obtain, if possible, a grant of money from the Government; and there was also a desire to promote a firmer bond of union in the profession. He need scarcely add that Sir Frederick's position and influence would tend to promote, if not accomplish, these worthy and essential projects. He trusted that the Council would, by a unanimous vote, repeat the expression of that confidence and appreciation in Sir Frederick Fitzwygram's merits that they had hitherto manifested.

Mr. HARPLEY seconded the motion. He was perfectly aware that Sir Frederick had very great scruples in accepting again, for the fourth time, the honoured position of President of the Royal College; but there were one or two matters yet incomplete, and without his influence and support there would probably be much greater difficulty in carrying them out than there would if he was kind enough to again accept the chair. There were two most important matters in hand—one being the abolition of the Highland and Agricultural Society's certificate, and the other the obtainment of some grant from the Government to assist in procuring a better building. Under those circumstances he hoped and trusted that Sir Frederick would do them the honour of again accepting the post of President of the College.

The motion was carried unanimously.

SIR FREDERICK FITZWYGRAM thanked the members for the confidence they had expressed towards him, and for the kindness with which they had given a unanimous vote in his favour. It was not his wish to accept the position, high and honourable as it was. In fact, he had fairly made up his mind to decline it; not because the duties were burdensome to him, for, thanks to the courtesy shown, and the general support given by the whole of the members of the Council, those duties had not been burdensome. He felt, however, that the office of President was an object of honourable ambition and legitimate desire for every member of the profession, and that it was undesirable, except in special cases, that it should be held by any one person to the exclusion of others who were fit for such a position. Circumstances, however, had occurred; and it had been represented to him that, with regard to the discontinuance of the Highland and Agricultural Society's certificate, he might be, for various reasons, an acceptable negotiator. He was not, as they were aware, a man who held extreme views. He adhered to the rights and privileges of the Royal College of Veterinary Surgeons sincerely and warmly, but he owed what he possessed, in regard to veterinary knowledge, to the school of Professor Dick, which was now more or less represented by the Highland and Agricultural Society. This would induce him to go into the pending negotiations in a kind and friendly manner. Having studied at that school, and being friendly with the Highland and Agricultural Society, he thought he might prove an acceptable negotiator; and for that reason—though it was quite contrary to his own views and wishes—he had great pleasure in accepting the high office which they had so kindly placed in his hands.

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Election of Vice-Presidents.

The election of Vice-Presidents was then proceeded with.

Mr. Hunt,	proposed by	Mr. Cartledge.
Mr. Withers,	,,	Mr. Dray.
Mr. Gowing,	,,	Professor Simonds.
Mr. Geo. Williams,	,,	Mr. Dray.
Mr. Naylor,	,,	Mr. Cuthbert.
Mr. W. Smith,	,,	Mr. Taylor.
Mr. Whittle,	,,	Mr. Greaves.
Mr. Moore,	,,	Mr. Harpley.
Prof. McCall,	,,	Mr. Morgan.
Mr. Cartwright,	,,	Mr. Reynolds.

On the ballot being taken it was found that the voting was as follows :—

	Votes.
Mr. Gowing	14
Mr. Cartwright	14
Mr. Withers	13
Mr. Hunt	12
Prof. McCall	11
Mr. Williams	11
Mr. Smith	10
Mr. Whittle	9
Mr. Naylor	6
Mr. Moore	5

Messrs. Gowing, Cartwright, Withers, Hunt, McCall, and Williams were therefore declared duly elected.

On the motion of Mr. DRAY, seconded by Mr. BATT, Mr. Withers was re-elected Treasurer.

On the motion of Mr. DRAY, seconded by Mr. GREAVES, Mr. Coates was re-elected Secretary and Registrar.

On the motion of Mr. DRAY, seconded by Mr. GREAVES, a vote of thanks was unanimously accorded to the Treasurer, who, Mr. DRAY remarked, did his duties efficiently without the slightest emolument.

This concluded the business of the first meeting; after which was held

A Second Special Meeting.

The Secretary read the following letters :

(1) From Professor Williams, Mr. Moon, and Mr. Fleming, regretting their inability to attend the meeting.

(2) From Mr. Proctor, acknowledging his election as a member of the Council.

(3) From the prizemen, acknowledging the receipt of prizes and medals from the Royal Agricultural Society.

(4) From Professor McCall, wishing to be informed whether Mr. Robert McCrindle, who entered under the old rules, and had been rejected three times at his first examination, was eligible to come up for examination in July next.

The SECRETARY stated that he was ineligible, in accordance with Bye-law 37.

(5) From the Military Secretary of the India Office, containing a list of the Indian army veterinary surgeons which was corrected for the Registrar, and also the report of deaths.

(6) A memorandum from the Veterinary Department of the Privy Council, suggesting several alterations in regard to the title of Veterinary Inspector in the Register.

The Secretary was instructed to comply with the suggestions contained in the letter.

Candidates for the Fellowship Degree.

The SECRETARY stated that two candidates had recently applied to him, and two others on the list had proposed coming up for examination. There were also three that made application in January last, but who subsequently wished to defer the examination to a future time. He proposed to ask those gentlemen if they would be inclined to come up; and it would be for the Council to fix when the examination would take place.

The Secretary was instructed to ask the three candidates whether they would come up for examination; and that a meeting of the Court of Examiners would take place after the July examinations.

The SECRETARY stated that Professor Brown had forwarded a copy of the Report of the Select Committee of the House of Lords on the Contagious Diseases (Animals) Bill, the Minutes of Evidence taken before the Committee, and the Annual Report for 1877.

On the motion of Mr. CARTLEDGE, seconded by Mr. TAYLOR, a vote of thanks was passed to Professor Brown for his kindness in forwarding the above-mentioned works.

The PRESIDENT then, in accordance with the notice previously given, moved that a Committee be appointed to confer with the Directors of the Highland and Agricultural Society with a view to the discontinuance of their examinations, so that the profession might be brought together in unity and brotherhood.

Mr. TAYLOR seconded the motion, which was carried.

The members of the committee appointed were the President, Mr. James Collins, and Mr. Wm. Robertson of Kelso.

Mr. HARPLEY, in the absence of Mr. Fleming, moved that the following petition (which had been drawn up by Mr. Fleming) be brought before the proper authorities :—

"*The Petition of the Royal College of Veterinary Surgeons to Her Majesty's Government for aid in order to render its services more extended and beneficial to Medical Science in general, and especially to Agriculture and the Public.*

"The prayer of the petitioners sheweth that in every country, and more especially in our own, the veterinary profession is of direct and great public utility, and that the value of its services is yearly increasing with the rapidly rising value and number of horses, cattle, and other useful domesticated animals. That while the services of the profession are sought for to assist in the multiplication and perfecting of the different breeds of these animals, and to indicate practically and scientifically how this may be best and most economically effected, its assistance is of special importance in the prevention and cure of the many accidents and disorders to which such animals are liable—a liability which becomes increased with their higher breeding and more artificial treatment. In the prevention and suppression of contagious maladies among animals, the veterinary profession can lay strong claims for recognition as a useful public body; and as some of these disorders are transmissible to the human species, and produce serious, oftentimes fatal,

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disease in it, its services to human sanitary police are most essential and important.

"In this direction, then, not only does veterinary science assist in increasing the number, utility, and value of the domesticated animals, and protect them from the evil consequences of this domestication and improvement, but it remedies their diseases and accidents; and in preventing or suppressing the destructive contagious maladies to which they are liable, it preserves a large portion of the national wealth from loss, while it protects the public food supply, and guards the community from the dangers attending the consumption or use of diseased flesh, milk, or other animal products.

"In addition to being the medical and sanitary guardian of the immense animal wealth of the country, veterinary science is also largely concerned in the promulgation of just views as to the humane treatment of animals in health as well as in disease; and it devotes itself in a special manner to the elucidation of the many animal disorders, their nature and causes, as well as the medical measures which will most economically and effectively prevent or cure them. As an exact knowledge of many at present obscure maladies of mankind can only be gained by studying the same or analogous diseases in animals, veterinary pathology in this way becomes intimately allied with human pathology, and can greatly assist in advancing it, and thus materially aid in preventing, or at least alleviating, human suffering.

"The great value of veterinary science in these different directions has been recognised in Europe only at a comparatively recent period; but this recognition has impelled every European country, except our own, to take this science under its especial and immediate care. Consequently, we find all these countries in possession of schools, several on a large scale, wherein veterinary science is cultivated and taught by eminent men; the schools being maintained by the respective governments at the public expense, as they were instituted for the public benefit.

"This country has been the last to estimate the value of veterinary science; and it has not yet recognised, except to the most insignificant extent, the benefits it has conferred, and may continue to confer, upon civilisation and humanity.

"The four veterinary schools in England and Scotland are private institutions, each belonging either to a single individual or the property of subscribers, who receive the value of their subscription in advice or medical treatment of their animals.

"Notwithstanding this disadvantage, and the lack of Government aid, the veterinary profession in Britain determined to exert itself in promoting veterinary education and in maintaining the scientific knowledge of its members at as high and uniform a standard as was possible under the circumstances. Acting upon this determination, in the year 1844 it petitioned Her Majesty's Government for a Charter of Incorporation which would enable it to exercise the powers of a corporate body, and utilise these powers to the advantage of the veterinary profession and the public.

"The prayer of their petition was granted, and the Royal College of Veterinary Surgeons was instituted in 1844. Since that date, up to the present time, this Corporation, while labouring under some great disadvantages—the chief of which was its want of funds and public support—has discharged to the best of its power the ever-increasing and important functions imposed upon it by the terms of the Royal Charter of Incorporation.

"While endeavouring to further the interests of its members, its principal and most responsible duty has been the promotion of veterinary education, by instituting, from time to time, such tests of professional knowledge in those who sought its diploma, as would not only protect its own reputation as a degree-conferring body, but would also afford a guarantee to the public that

the holders of this diploma were competent and fully qualified veterinary surgeons. These tests have been applied to candidates for the diploma by the highest medical and veterinary authorities this country has produced, and the candidates who come from the schools of England and Scotland are submitted to a severe and uniform examination. The subjects in which the students are instructed, as well as the period of study, are regulated by the Royal College, and everything pertaining to the advancement of veterinary medicine, and its utilisation for the public good, is carefully considered by it.

"Since its incorporation in 1844, the Royal College of Veterinary Surgeons has provided the country with upwards of THREE THOUSAND qualified practitioners in animal medicine and surgery. These graduates have not only practised their profession with advantage to the three kingdoms, but every part of our great empire has benefited from their presence, while in the army they have served the country in peace and in war.

"The institution which has done so much public and professional service could not be maintained without considerable expense, and much sacrifice of time and thought on the part of the profession. It has never received any extraneous assistance; but has existed on its own efforts and the examination fees obtained from its graduates. The latter have been necessarily fixed at the lowest possible sum, so that they might not deter poor but worthy men from joining the ranks of a profession which has had to fight its own way to position and appreciation.

"But with the rapidly developing demands of medical science, the greater amount of knowledge required from members of the veterinary profession—due to the higher and more exacting services they are called upon to render—and the yearly increasing expenses incurred by the Veterinary Corporation in maintaining an ever-rising standard of efficiency, it is found that the past rate of progress cannot be sustained without some help from the country. The annual income is not sufficient to defray the heavy expenses attending the graduation of students, and keep up a suitable building for the work of the Royal College. The place where its business is now transacted, and where it has its home, is every way inadequate to its requirements, and does no credit to a country which possesses the finest and most valuable domesticated animals in the world. It is situated in one of the most undesirable parts of London, has no accommodation, and is destitute of a museum for instructional purposes, and of other facilities which are urgently needed, if veterinary medicine in this country is to keep pace with that in other countries.

"In this crisis in its history, the Royal College of Veterinary Surgeons of Great Britain and Ireland feels itself compelled to appeal, for the first time, to Her Majesty's Government for countenance and support in its laudable desire to still further benefit the country by continuing to improve veterinary education, as without this countenance and support such improvement is now impossible.

"It is obvious that veterinary medicine is as yet in its infancy; it has only of late years begun to yield some of the benefits it will undoubtedly confer, when properly cultivated and fostered. Up to this time the Royal College has exerted itself to the utmost to serve the public interests without asking for any acknowledgment or compensation from the public; but in the circumstances in which it is now placed it can no longer attempt to do so, with dignity to itself or advantage to the community, without aid from the country it has so well served and so largely benefited. Though these benefits have been so great and so manifest, yet of all the learned bodies the Royal College of Veterinary Surgeons would appear to be the last to obtain recognition or assistance.

"Your petitioners would humbly beg to draw attention to the fact, that in

1799 the Parliament of this country voted the sum of £15,000 for the museum of the Royal College of Surgeons, and that in 1806 another sum of £15,000 was voted in aid of the erection of an edifice for the display of an arrangement of the Hunterian collection; while a third grant of £12,500 for the same purpose was subsequently voted, and in 1847 another sum of £15,000 in aid of an extension of the museum buildings. Your petitioners may be also allowed to refer to the fact that the Royal College of Physicians hold premises under the Government at a merely nominal rent, while the Government has found a local habitation for nearly every scientific society in London.

"Your petitioners would beg most earnestly to assure Her Majesty's Government that they are only actuated by an unselfish and patriotic desire to directly benefit the country in soliciting its assistance, and whatever aid it may be pleased at present to bestow will be repaid tenfold hereafter.

"The Royal College of Veterinary Surgeons is anxious and willing to continue its labours for the public good; but it feels that, in return, it has a strong claim for recognition in what it has already accomplished, and what it now seeks to achieve.

"It therefore humbly prays that Her Majesty's Government will graciously take into consideration the prayer of the petitioners, and favourably respond by granting either a building which would meet the requirements of the Royal College, to be maintained at the cost of the Corporation, or a sum of money sufficient to provide such premises."

Mr. CARTLEDGE seconded the motion, which was agreed to.

On the motion of the PRESIDENT, seconded by Mr. DRAY, a vote of thanks was accorded to Mr. Fleming for his trouble in drawing up the petition.

The SECRETARY was instructed to have 200 copies of the petition printed for circulation.

A vote of thanks having been passed to the President for his conduct in the chair, the Council adjourned.

SCOTTISH METROPOLITAN VETERINARY MEDICAL ASSOCIATION.

THE quarterly meeting of this Society was held in the London Hotel, Edinburgh, on Wednesday, the 5th June. Professor Baird, of the Dick Veterinary College, president, occupied the chair. There was a fair attendance of members. Several interesting pathological specimens were presented for inspection. The first of these was a case of hernia of a portion of the small intestine of a horse through the *foramen sinistrum* of the diaphragm. The case occurred in the practice of Mr. Rutherford, Edinburgh, and was especially interesting, inasmuch as it was evident, from the nature of the adhesions formed between the intestine and the diaphragm, that the hernia had existed for a considerable time, although the animal had been worked till the day on which it died. Previous to this it had never exhibited any very marked symptoms of illness.

The next specimen, which had been obtained by Mr. Cunningham, Slateford, was a very extensive aneurism of the cœliac axis of a horse. With reference to this case Mr. Robertson, Kelso, stated that such cases were by no means so rare as was generally supposed, and related particulars of several instances which had come under his own observation.

Professor Walley next exhibited a case of complete torsion of the cervix uteri of a cow, and another of diffuse aneurism of the spermatic artery of a bull. The particulars of these have already appeared in the *Veterinary Journal.* He next presented a cow's kidney showing extensive encephaloid

cancer. (The details of this case are given as an Original Communication in the present *Journal.*)

Professor BAIRD then delivered his presidential address. In the first place, he took the opportunity to thank the members of the Association for the great honour they had conferred on him in electing him their president. It was with feelings of fear and pride that he had accepted the high position,—of fear lest any shortcomings of his should mar the usefulness of the Society, and of pride that he should have been thought worthy of the dignity, seeing that the chair had previously been occupied by gentlemen of great eminence in the profession. He next proposed to run over, in rapid review, the progress of the profession since he joined its ranks. It was in the year 1843 that he for the first time entered the gates of his *alma mater.* The students at that time were under the tuition of only one master—Professor Dick—who loved and laboured to elevate the profession, and who has left both a name and his means behind him for its advancement. The lectures then comprised Veterinary Pathology and Anatomy, but all the students were privileged to attend certain classes at the University. As time wore on, however, Dick, with his natural shrewdness, saw that the profession was growing in favour with the public, and he likewise saw that to increase this growth a more complete course of instruction was necessary; so to bring about this he found it necessary to organise a staff of teachers.

Professor Baird then traced the various stages in the development of veterinary science as taught in this country. He showed how Materia Medica, Chemistry, Physiology, and lastly, Botany, had been successively constituted separate and distinct branches of study; and how, as a necessary consequence, the period of study had to be lengthened, until the curriculum now extended over three winter and two summer sessions. He went on to say that, from the high standard of education received, veterinary surgeons ought now to be able to take their stand alongside the members of the sister profession. It might be remembered that, at the time of the last great outbreak of Cattle Plague, they had been sadly twitted by those of the medical profession for their want of skill in not being able to find a cure for the fatal malady, or give a proper account of its pathology.

Such retrospective remarks as these might serve to show the very considerable development which had taken place in the teaching resources of the veterinary schools of this country within the past forty years; and from this might be formed a pretty correct estimate of the advancement of the profession as a body. If, he went on to say, they had not been advancing by gigantic strides, their onward march had been steady, while they might even say the pace had been creditable, considering the obstacles which had had to be overcome. In this country veterinary science owed nothing to the fostering care of Government; neither could it be said that the public had encouraged it. There was, however, one body to which would be conceded, by all except the bigoted and the uninformed, credit for its endeavours to promote the interests of veterinary science. At a time when the condition of even members of the profession might be described as one of apathy, the Highland and Agricultural Society, by the institution of examinations, the appointment of lecturers, and the bestowal of prizes, gave to the pursuit of veterinary knowledge an impetus to which might be traced not a little of the advancement which had taken place, more particularly in this part of the kingdom. Now that the members of the body which claimed to have received from Government the monopoly of looking after the interests of the profession seemed to be awakening from their torpor, they found some of them devoting their energies to vilifying the Highland Society and casting ridicule upon those members of the profession who practised on the strength of the degree conferred by that body. Upon all that, however, the man who was conscious of

the soundness of his own knowledge could afford to smile, and even return contempt for contempt. But when it was sought by legislation to deprive these members of the profession of their right to fill offices for which they possessed qualifications equal to any, it was time to resist to the utmost the unjust imposition,—he referred to the clause of the Contagious Diseases (Animals) Bill, which sought to enact that holders of the veterinary certificate from the Highland Society should be ineligible for the office of veterinary inspector.

In conclusion, he would express the opinion that if each member who had spare time and energy to devote to stirring up fruitless dissensions, would, instead, spend that time and energy in an unobtrusive but earnest endeavour to add some little to their (alas!) too limited store of knowledge, he would then, to the best of his means, be advancing the interests of the profession.

A discussion on the Contagious Diseases (Animals) Bill having been opened by Mr. Robertson, Kelso, Mr. CONNACHER, Perth, mentioned that, in his position as inspector, he was cognisant of the existence of Pleuro-pneumonia in eleven byres in the "Fair City," which he could trace to the importation of Irish cows. He therefore advocated the adoption of a more rigid inspection of Irish cattle before they were sent to England or Scotland. Mr. WAUCH, Stirling, explained that he had officially attended the Falkirk Tryst during the last eight or nine years, and had never found a case of Pleuro-pneumonia among the cattle, which were mostly Irish. Mr. CONNACHER pointed out that the disease took a time to develop itself, and that cattle suffering from Pleuro which could be detected were not likely to be taken into the market. Mr. REID, Leith, as the result of eight years' experience there, also considered Irish cattle a fruitful source of disease, and looked upon the existing system of inspection as trivial. Mr. BALFOUR, Kirkcaldy, corroborated the remarks of Mr. Connacher. Principal WALLEY, after expressing concurrence in what the President had said with reference to the Highland Society, remarked that veterinary surgeons knew practically that there was no disease in Norway, Sweden, or Denmark. He did not see, therefore, why the Privy Council should not have retained to itself the power which it had done in the case of the Channel Islands, of allowing the importation of stock from such countries as he had mentioned, so long as it was proved that no disease existed in them. He knew that he might be met by the statement that Foot-and-mouth Disease had been imported from Denmark; but it was remarkable that he had never seen the least sign of it amongst cattle arriving from that country. He agreed with the statement of Mr. Reid, that many of the outbreaks of disease in Leith could be traced to the importation of Irish cattle. At the close of the discussion the thanks of the meeting were accorded to Professor Baird for presiding.

J. MCFADYEAN, *Secretary.*

CENTRAL VETERINARY MEDICAL SOCIETY.

AT the meeting held on Tuesday, May 7th, Professor Axe in the chair, an essay on "Germs, the Part they play in the Production of Disease," was read by Mr. GREAVES, who said in conclusion that they had been recently delighted to see Professor Axe in Yorkshire, where, in some remarks on "Germs," he had thrown much light on the subject, and he had no doubt that he would be able on the present occasion to clear up some of the points which hitherto had been in darkness.

Professor AXE said, as Mr. GREAVES had just remarked, he had recently enjoyed the pleasure of listening to the essay which had now been brought before them, while on a visit to the Yorkshire Veterinary Medical Society.

But this fact did not in the least degree detract from the interest and pleasure he felt on the present occasion. The subject of the paper was one which at the present time occupied, if it did not even convulse, the scientific world. The question of germs and germ life was the stirring subject of the hour, and called into the sharpest activity leading members of almost every branch of science. It was not, he said, simply a question of pathological interest; it was one that involved that mysterious, and as yet abstruse problem, the origin of life, to the solution of which so many able minds had devoted their greatest capacity. The biologist, the chemist, the physicist, were alike concerned to know the special conditions out of which life was evolved; but the more immediate and important aim of the pathologist was, as indicated by the essayist, to determine, for the benefit of man and beast, the part played by living things in the production and propagation of disease. That the lower forms of life did enter into and seriously damage the structure and disturb the function of higher organisms, was a fact with which we were abundantly familiar, and of which we needed no further assurance than that so largely furnished in the life-history of human and bestial parasites. It was not, however, the tangible living animal forms alone that infested and preyed on the life of man and beasts. The microscope had demonstrated again and again that in the extreme limits of animal and vegetable life there were found elements of the most loathsome and troublesome diseases—elements whose morphological characters were as familiar to us as were those of man. He need hardly say that this was not exactly the case in regard to what were known as "germs"; but in view of the rapid strides which had recently been made in the study of contagia they were not without hope that ere long research would accomplish much towards the differentiation of disease germs.

There was one question which seemed to him to commend itself to their minds with considerable force, and about which all of them should be fully assured before endeavouring to deal with the ulterior and perplexing question of germ action: he alluded to the existence or non-existence of disease germs. Was it the fact that organised matter, endowed with a reproductive power such as was suggested by the term "germ" (*i.e.*, having the constitution and nature of an egg) really played the part of a disease factor? and if so, on what evidence did such a fact rest? The difficulty which belonged to a physical demonstration of microscopic forms was, at all times, adverse to conviction, even among those in whom unphilosophical faith ran high; but so strong and irresistible were the facts developed in support of the germ doctrine of disease, that to know and appreciate them was to be convinced of its reality. Without referring to the early experiments of Tyndall, which showed that the air teemed with particulate matter, organic and inorganic, living and dead, they had the still more convincing testimony of Pasteur, Lister, Chauveau, and Dr. Sanderson, in all of whose researches we recognised a link in the chain of evidence relating to the existence of disease-producing germs. Pasteur, by his process of filtering air through gun-cotton, showed that the atmosphere contained organised particles, which under favourable conditions, as when allowed to fall into putrescible solutions, reproduced themselves in countless numbers. He further demonstrated the presence of living forms by the negative results which followed the calcination of air in regard to the same media.

In these experiments they would recognise at once the existence of particles of matter possessing the property of reproduction, and as such acting the part of what we understand by the term "germs." The antiseptic system in the treatment of wounds, and the ligaturing of arteries as developed by Professor Lister, was based on the knowledge of the existence in the air of organised particles, to which suppuration and the adverse results of surgery were referable. The filtration process of Pasteur was precisely what Lister

adopted, when he applied to wounds a covering of cotton wool. In both instances the living organised matter was intercepted, as was the precipitate by the filter paper of the chemist. But, he remarked, it might be said that such experiments bore lightly on germs in relation to disease. He would, therefore, remind them further of the important facts enunciated by Chauveau, and confirmed by Sanderson. Chauveau adopted a method of research which developed the most valuable and interesting facts. He filtered the virus of Glanders and Sheep-pox through porcelain, and was thus enabled to separate the solid from the liquid portions of the virus, and afterwards to test separately the infecting power of the two constituents. He then found that while the solid particles arrested by the porcelain were capable of exciting disease, the liquid portions possessed no such property. He demonstrated, in fact, that the actual contagium in these particular maladies were composed of insoluble, indiffusible particles; and, moreover, he showed that when such particles were implanted in the system of healthy animals, they multiplied their kind, and displayed in this one act alone the special property of germs. Sanderson, in pursuing a similar course of inquiry, found likewise that the infective property of the blood in Cattle Plague existed in the material which would not diffuse through parchment paper. With such results as these before them, the existence of disease germs could no longer remain in doubt. Of the precise form and higher endowments of these living particles they were not acquainted. As yet, he continued, the microscope had not enabled them to distinguish the disease-producing germs from an ordinary bioplast, nor had chemical science defined any special formula as belonging to them.

The part germs played in the production of disease, he continued, was a matter of the highest pathological interest, and could best be studied in connection with the eruptive fevers. In these affections they remarked that after the introduction of the virus into the system a definite period elapsed before the phenomena of disease were developed. In that respect disease germs conformed to the general conduct of germs as they recognised them in a tangible form. Just as the first phase of vital activity in a grain of wheat was hidden from view, so was the manifestation of life in the disease germ. It was not until they saw the stem of the one and the eruption of the other, that their vitality and powers of reproduction were known. Inasmuch as new matter was evolved in the growth of the contagium, that could only be effected by the appropriation of one or more of the constituents of the body; but which, or how many of those constituents, or in what condition, were questions as yet unsolved. That those constituents were important to life was suggested by the extreme prostration and rapid emaciation which followed the incubation and propagation of the contagium.

Various, he said, were the doctrines which, from time to time, had been propounded by different observers as to the precise *modus operandi* of contagia; but the confliction of the arguments employed, and the want of unanimity in the interpretation of clinical and physiological phenomena, had rendered the most commendable doctrine unacceptable.

Mr. GREAVES thanked the President for the clear exposition he had given of the facts in connection with germs, and said he was much pleased with the manner in which the question had been taken up. The President had proved himself to be a close thinker and reasoner; and it was a subject which required both. There was, indeed, a reality in these germs, but it was only the advanced thinkers of the present day who appreciated the importance of the subject; and he had no doubt that, as their knowledge permeated a little further, it would in a few years enable them to answer the questions which, at the present moment, they were unable to answer. The President had agreed with him in every particular but one, and that was the nature of

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germ life. The President believed that the active principle which existed in the atmosphere was an organism. Now he considered that it was not an organism until there was added to it, or till there had come in contact with it, dead animal or vegetable mater. It had never been proved that those germs that floated in the air had life in them, but only that as soon as any of them, came into contact with dead animal or vegetable matter, they were perceived to be alive, and to float about with great rapidity; it had never been proved that any such existences took place before they had come into contact with dead animal or vegetable matter. He called them germs; the President called them organisms; that was the point on which they differed. It was a point of importance, and he had no doubt, as science cleared off the mist a little more, that the point would be cleared up to the satisfaction of them all.

Mr. MOORE said the essayists had mentioned some experiments and remedies tried in Manchester. He would like to know when they were instituted, for, if they were to believe the reports of two or three years ago, diseases had been very fatal in Manchester and the neighbourhood which ought to have been prevented. He would also like to know rather more distinctly the difference between Mr. Greaves and the chairman. The essayist called them germs, and the chairman organisms. He supposed it might be at one time a germ and at another an organism. Perhaps it was a germ when it floated in the air, but an organism when it got a proper "nidus," or as it were got into a living body and became developed into an organism.

The PRESIDENT said he was quite at one with the essayist in terming what they were now speaking of as germs—by which he understood certain particles of living organised matter capable of reproducing themselves, as illustrated by the contagia of specific fevers; and he used the term organisms in this sense only as applied to germs. The property of reproduction was innate in the wheat grain. So it was, he apprehended, in the germs of specific fevers; but they did not manifest their vitality and their property of reproduction until placed, like the wheat, in a soil which would furnish the materials of growth and development.

Mr. MOORE said then it might have the power of life, though not possessing life. He contended it was not living till it came into contact with the soil.

Mr. GREAVES said there certainly was force in what Mr. Moore said; and although he could not illustrate his meaning by anything very clear and tangible, that illustration which Professor Axe gave of a grain of wheat might be taken as a very fair illustration of what they meant. The grain of wheat did contain life, but it could not propagate grains of wheat until it came into contact with suitable surroundings to enable the life that was in it to propagate and develop itself. It would be almost idle to dispute about this point; they ought now to try to come to the application of the subject. They were satisfied that the germs did exist in the air. In a stable containing glandered horses the air became contaminated with glanderous matter, which would pass from one stall to another, and up and down the stable. If they took these horses out they still left the poison floating in the air; if they put other horses in, it was a hundred to one that some of them would become infected with the poison. Now, he would be glad if they could enter into that matter, and thus apply the subject, and try to gain some advantage of knowledge that they did not previously possess. He had known stables where every precaution had been taken to destroy the virus of Glanders. He had gone into stables where they had been emptied. He had known a thirteen-stall stable emptied three times over of every horse during a period of about twelve months; they might go into that stable and try to find fault with it,

XUM

and he could almost defy them to find any fault. They could almost eat their dinner off the stones, or out of the manger. The boskins were as clean as a butcher's block; the ventilation they would find to be perfect, or thereabout; the sewering or soughing had all been taken up, and new gravel put down, the paving stones taken up, all the *débris* taken away and fresh gravel put in, and still the disease existed. Now, where did it exist? Was it in the wood? Or was it in the atmosphere, which they might suppose had been blown out over and over again? He was not sufficiently clear on the point in his own mind to say how it was; but he had known in such a stable the white-hot irons to be put in when everything had been used, and the place lime-washed over and over again, with carbolic-acid dressing to the floor, M'Dougall's powder, and other things, and still the disease had existed as rife as it was before. He had then, as he said, put in his hot fires, carried them into every stall, and let them remain for an hour, or even for days, and then carried them into another stall, and than another. From that time there had been no disease in that stable; and he had known this in several instances. One fact was worth a thousand theories. It might be there were some instances where it had not succeeded; but in several it had succeeded completely. He gave them no opinion on the process, but would ask them in return to give him their opinion of it.

Mr. MOORE asked if it had never struck Mr. Greaves that this infectious matter was in the bricks. It was a fact well known that an ordinary brick would absorb a pound of water, and according to the state of the atmosphere bricks would be giving off a lot of that water at one time, and at another time absorbing a lot; and very often these cases of Glanders would be found to be taken from the bricks. He knew of an instance where a man had rather too many horses in his stables, and he had always Glanders amongst them. The bricks were giving off emanations as he had described. He would give them a strong illustration of this, relating to a he-goat, which was tied up in a stable. He emitted a strong smell, and for years after that animal was dead and gone the emanations from the bricks were very strong indeed. Now, he contended, if such was the case with an animal such as that, it would be the case with Glanders and in other infectious diseases; and he thought that might be a pretty fair solution of Mr. Greaves' cases of Glanders happening from time to time. He granted it was a very good plan burning it out; it would dry the bricks and extract a good deal of the poison, but probably not all.

Mr. COX said that one scarcely knew whether to endeavour to add anything or to feel that enough had been said. They were very greatly indebted to Mr. Greaves for coming amongst them, and for opening a subject which might very well last the Association to the end of the session. The subject was most important, and it would be difficult to carry on the discussion among themselves, because they all must acknowledge themselves to be learners, with very little information to impart. They must take much on trust from men who had the results of experiments to place before them, from having been enabled to devote their time to researches in this matter. Whatever subject they took up in connexion with germs would in itself be a special subject for a whole evening. In this question raised about glanderous matter, it occurred to him, first, whether in the case specially introduced by Mr. Greaves in reference to that excellent stable in which Glanders had reappeared, they were always fresh horses that were introduced, or whether some of the original occupants were introduced after the cleansing. Perhaps he would tell them whether he was quite sure there was not any disease latent in one of those animals which might account for the cases occurring. They knew that a horse might easily be overlooked, and be brought back and do much mischief. With reference to the bricks holding the poison of

Glanders, and giving it out by evaporation and producing the disease of Glanders in other horses previously healthy and sound, he confessed he was very sceptical. He was by no means sure whether he had ever met with a case of a horse contracting Glanders purely by infection. He knew it was very contagious, and he believed that infection was the great medium through which Glanders was introduced and propagated in this country. He had known scores of cases of horses in the same stable where contact had not absolutely occurred pass through the ordeal for a long time without becoming glandered. Again, in cases where stables had been thoroughly cleansed and thought to be disinfected, and where a horse had been put back again after being placed in a quarantine, yet Glanders had developed; but in every case he believed there had been Glanders in some one of the horses, in a form capable of propagating it.

A case he well remembered some twenty years ago came to his mind, of a stable holding thirty horses, in connexion with Messrs. Whitbread's brewery, in the oldest stable in the place, where, for want of space, the horses used to stand in a long manger without stalls or divisions of any kind,—so that probably five horses would be kept in the place of four throughout. The stable was in the form of an L, the end of the stable forming a *cul de sac*; the place was badly lighted and badly ventilated, with no direct outlet, but some small windows in half the stable; it was also badly paved. If ever he was called there in the night, or early in the morning, he had at once been struck with the fœtid emanations from the horses; and there were accumulations of drainage, so that it was no wonder they were continually having cases of Glanders in that stable. That stable had been cleansed and whitewashed, and the horses taken to another part of the establishment, where they seemed doing well; but when returned there again Glanders and Farcy reappeared. As it was becoming a very serious matter, losing horses like that, and the firm had no such loss among their other horses, numbering one hundred, it was determined to have the stable repaved and properly drained; they had also a shaft with a diaphragm put up at the end of the stable, and the place thoroughly cleansed; one or two old worn-out horses, which were looked upon with suspicion as possibly harbouring disease, were killed, the others went back to the stable, and they never had another case of disease. It was looked upon by the firm, then, that the drainage and ventilation, and the shaft which had been put in, had put a stop to the retention of poisonous (not necessarily glanderous) matter from the other horses.

Mr. GREAVES said, in answer to Mr. Cox, that the horses were removed out of the stable two or three at a time. There was no one horse in particular left in the stable alive; they all died off. No one horse or two remained alive. In addition to the fires he had made an alteration in the ventilation—having had two large holes made through the wall on the ground surface, and one through the highest part of the stable. The horses were the same still under the new company.

Mr. ROWE (Hon. Sec.) said that a few sentences which passed from the essayist reminded him of something which might be worthy of repetition. Some years ago, a Mr. Lens Aldous submitted to him a number of photographs of the human breath taken from a hospital, of which he said he had the free run. The patients suffering from all manner of diseases breathed, and the breath was conveyed to the glass, covered, and then photographed; and these photographs, if correct (as he had no reason to doubt), gave distinct forms in the case of each disease: a process which Mr. Aldous claimed as being original. Unfortunately he did not purchase any of them, and had forgotten the name assigned the process. The photographs, looked at generally, were extremely interesting. It was maintained by him as diagnostic of destructive diseases.

A short reply from Mr. GREAVES, and the meeting adjourned.

LIVERPOOL VETERINARY MEDICAL ASSOCIATION.

THE fifty-fifth quarterly meeting of the Association was held at the Medical Institute, Hope Street, May 10th, 1878, Wm. Whittle, Esq., president, in the chair.

There were present—Messrs. Reynolds, Heyes, Morgan, Moore, C. W. Elam, and Watson, of Liverpool; and Thos. Greaves, of Manchester. Letters of apology were received from Messrs. G. Fleming, W. A. Cartwright, T. Roberts, H. J. Cartwright, John Carless and Son, Jas. Howell, J., W., and S. Leather, Tom Taylor, and Sam. Locke. The minutes of the previous meeting were read and confirmed.

The "Fleming Testimonial Fund" Committee gave in their report, and were instructed to continue their efforts in order to make the fund as great a success as possible.

It was then unanimously resolved that, on the occasion of Professor Walley's visit to this Association in July, a dinner be provided on the same plan as last year. The following gentlemen were appointed a committee to carry out the necessary arrangements: Messrs. Reynolds, Morgan, and the Secretary.

Mr. James Watson, Liverpool, was nominated for election as a member of the Association.

Mr. MOORE read a paper on "Purpura Hæmorrhagica." He apologised for the incompleteness of his paper. He had intended and had made some progress in the examination of the pathology of this somewhat obscure disease; but a number of unforeseen circumstances occurred which interrupted his investigations, and he was reluctantly compelled to abandon that portion of his subject, not being in a position to throw any fresh light upon it other than what was already known to most of them. He then briefly sketched the symptoms and distinguishing characters of this disease, and reviewed the several modes of treatment recommended by the different veterinary authors. His principal purpose, however, was to bring before their notice a remedy which had been used by his father, Mr. Moore, of London, and himself for a number of years, and with marked success—viz. potassæ bichromas. He proceeded to give abstracts of a number of cases treated by this agent—some of them evidently of great severity; but such was his faith in the potency of this remedy, that he continued its administration in the most aggravated and complicated forms of the disease, regarding it as nothing less than a specific for this malady. But he cautioned the members against the administration of too large doses, as they would only aggravate, instead of alleviate the symptoms. The dose he recommended was ¼th of a grain in solution, repeated every four hours. As an external dressing to the swellings, he used linimentum calcis.

A very animated discussion followed, in which the whole of the members present took part. None of them had tried the remedy recommended by Mr. Moore in the treatment of this disease, although some had tried it in the treatment of other diseases for which it was declared to be a specific, but could not report very satisfactorily of its beneficial effects. They had, however, administered it in somewhat larger doses than that recommended by Mr. Moore. The treatment generally practised, and almost unanimously recommended for this disease by those present, was, first, the administration of a laxative, accompanied by diuretics and followed by vegetable and mineral tonics. Some preferred the administration of a dose of aloes, while others recommended linseed oil in the first stages of the disease; the general opinion being that a marked alleviation of the symptoms invariably followed the evacuation of the bowels; and it was remarked that the fæces discharged

under such circumstances were generally of a very fœtid character, and voided in large quantities. Oleum terebinthæ was recommended, except by the President, who had used iodide of iron, combined with stimulants—good ale being a special favourite of his. He did not give purgatives.

Good food, cleanliness and fresh air were considered great auxiliaries in the treatment; but when symptoms of abdominal pain were manifested, indicating that the bowels and internal organs were affected, it was considered advisable to withhold dry and solid food from the patient, although in many cases the appetite might remain good. Exercise, at least in the more aggravated forms of the disease, was not considered beneficial, while bleeding was generally considered as contra-indicated. It was mentioned by several members that the application of a blister to the swellings about the head very often removed them almost instantaneously; although in one or two cases somewhat serious results followed such an application to these parts. Puncturing the swellings was generally condemned. The experience of most of the members was that, when the lungs and other internal organs became very seriously affected, the case very frequently terminated fatally in a few hours.

A vote of thanks was warmly accorded to Mr. Moore for his paper; and one to the President terminated a very interesting and instructive meeting.

D. HUTCHEON, *Hon. Sec.*

Jurisprudence.

ACTION BY A VETERINARY SURGEON.

AT the Barnard Castle county court, on April 8th, Mr. Mulvey, M.R.C.V.S.L., practising at Bishop Auckland and in Teesdale, sued Mr. Hird, a farmer residing at High Spital, near Barnard Castle, for the sum of £1 2*s.* for professional attendance to his stock. Mr. Nixon appeared for the plaintiff. Defendant admitted owing 10*s.*, but repudiated the remainder of the claim.

Mr. Nixon called Mr. Hingston, veterinary surgeon, who in September of last year was an assistant in the employment of the plaintiff. Witness immediately applied to the Judge for his costs before giving evidence. His Honour said the law provided that if a witness was in court he could be sworn. Witness then said that his name was John Compton Hingston.

His Honour: "Are you a Devonshire man?"

Witness replied in the negative.

The Judge said there were several families of that name in Devonshire. Where did witness come from?

Witness said he came from America. On the 6th of September he went to the defendant's farm, and treated an animal which was ill. He could not say that he again went to Hird's on the 10th of the same month.

Mr. Nixon then handed in a book, the writing in which was admitted by witness to be his own. He would not swear, however, that the Hird visited by him on the 6th and 10th of September, and recorded by witness himself in the book, was one and the same person. He was a stranger in the district, and he could not exactly say whether or not he went twice to the defendant's house, although it was true that there were two entries in the book, which had guided Mr. Mulvey in sending in the account.

In answer to the Judge witness said he now saw his own entries in the book, but he did not recollect whether he was at Mr. Hird's once or twice.

Mr. Nixon: "Are you aware that this is not the first case of the kind where persons have disputed your entries?"

Witness: "My own opinion is that the work has been done for another Hird."

Mr. Nixon said there were records of ten professional visits to Middleton, and the party charged had repudiated seven of the visits.

Defendant himself said he had only once in his life engaged a veterinary surgeon, and that was on the 6th of September, when Hingston came. That was positively the only time he had ever had him on his premises.

Mr. Hingston did not deny the statement.

Mr. Nixon (addressing Mr. Hingston): "When you were engaged by Mr. Mulvey did you not enter into an agreement with him that you would not practise within ten miles of Barnard Castle?"

Witness: "That has nothing to do with the case."

His Honour: "Did you, or did you not?"

Witness: "Yes; I did."

His Honour: "Has there been anything done to cancel that agreement?"

Witness: "I don't know of anything that has been done."

It was said that there was not another Hird at High Spital except defendant. There was a Hird living at Bowes, and a Hird living also at Thackholme, which was some distance away.

His Honour said he had not the slightest doubt about the matter, and found for the plaintiff for the full amount claimed, with costs.

Notes and News.

DOG LICENCES AND HYDROPHOBIA.—A return just issued shows that last year 1,238,867 licences for dogs were granted in England, and 153,309 in Scotland. The numbers granted in the preceding year were 1,209,490 and 152,686. During the year 1876 the number of deaths from Hydrophobia was 53, the number in 1875 being 47; in 1874, 61; in 1873, 28; in 1872, 39; in 1871, 56; in 1870, 32; in 1869, 18; in 1868, 7; in 1867, 10; and in 1866, 36.

ARMY VETERINARY DEPARTMENT.—The *Army and Navy Gazette* of May 25th, commenting on the new Veterinary Warrant, remarks: "It is undoubtedly a blot that it offers no reasonable prospect of promotion, but the heads of the Department must be relieved of all responsibility for this defect. In every walk of life it is necessary to provide an incentive to zeal; and in no way can this be done more effectually than by showing a young man, on his first entrance to the Service, that there is a fair prospect for him, if only he feels disposed to work and endeavours to fit himself for the increased responsibilities. The prospects of the junior veterinary officers, it must be admitted, are somewhat discouraging. After twelve years, it is true, they are raised to First Class, but having reached this goal, it would appear as though their strongest hopes become realised; for the inducements to retire which the seniors receive are not such as to attract men in the prime of life, and though one here and there may make up his mind to withdraw into private life, the general body may be expected to remain until they reach the age when retirement is rendered imperative. It is a pity the War Office did not take a more liberal view, for it has spoilt what in other respects would have been pronounced a successful attempt to reorganize a department which has grown immensely in importance since the Crimean days, when it was but a mere skeleton of its present self."

A RESPECTED CHARGER.—The following regimental order has been issued to the 7th United States Cavalry:—"The horse known as 'Comanche,' being the only living representative of the bloody tragedy of the Little Big Horn, June 25, 1876, his kind treatment and comfort should be a matter of pride and solicitude on the part of every member of the 7th Cavalry, to the end that his life may be prolonged to the utmost limit. Wounded and scarred as he is, his very existence speaks in terms more eloquent than words of the desperate struggle against overwhelming numbers, of the hopeless conflict, and of the heroic manner in which all went down on that fatal day. The commanding officer of Company I. will see that a special and comfortable stall is fitted up for him, and he will not be ridden by any person whatever, under any circumstances, nor will he be put to any kind of work. Hereafter, upon all occasions of ceremony (of mounted regimental formation), 'Comanche,' saddled, bridled, draped in mourning, and led by a mounted trooper of Company I., will be paraded with the regiment." "Comanche" carried Capt. Keogh, an Irishman, into the fight at Little Big Horn.

VETERINARY LITERATURE.—We understand that Mr. Fleming, author of "Rabies and Hydrophobia," "Text-book of Veterinary Obstetrics," etc., is engaged upon another large work entitled a "Text-book of Comparative Pathology (General and Special) and Therapeutics." Mr. Fleming's great literary abilities and research warrant us in looking forward to an original and comprehensive contribution to our pathological knowledge.—*Medical Press and Circular.*

LOSS OF FOURTEEN STAGHOUNDS FROM RABIES.—A serious disaster has befallen the splendid pack of staghounds used in hunting the Exmoor country, under the mastership of Mr. Mordaunt Fenwick Bisset. On the last day of the past season the foremost hound of the pack was bitten, as it was running through a field, by a strange dog that came out of a hedge. No notice was taken of the wound, and before Rabies developed itself the hound had bitten thirteen others, all of which have had to be destroyed. The animals are not only very valuable, but very difficult to be got; and it is feared there may be no stag-hunting next season in the red deer country.

THE *Field* regrets to hear that Lord Galway has experienced a great loss in his well-known pack of foxhounds. A few days ago a couple showed some suspicious symptoms, though not the usual ones, of Hydrophobia, and as a precautionary measure Lord Galway at once ordered the whole of the bitch entry to be destroyed—a great sacrifice, as they were an unusually good lot. It has always been the custom, however, at the Grove kennels, to keep the young hounds in a separate kennel about a mile from Grove, so no danger need be apprehended for the old hounds of the valuable and old established pack.

HYDROPHOBIA.—A girl has died from this disease in the Oldham workhouse, after having been bitten by a stray retriever dog. Another inmate of the workhouse, an old man, was also bitten, and symptoms of Hydrophobia manifested themselves in his case also. But he has, it appears, recovered.

PHENICATED CAMPHOR.—A correspondent of the *Agricultural Gazette* notes the fact that the attention of the medical world has only recently been drawn to this remedy, but it is destined in the hands of skilful veterinary practitioners to be of untold value. It was introduced by Dr. Soulez, under the above name; it is merely a simple solution of 2½ parts of camphor in 1 part of carbolic acid. The mixture, when carefully prepared, has a pale straw colour, and is of an oily nature—all trace of the unpleasant smell imparted by the acid seems lost, and instead a slight camphor odour can be detected. It should not be forgotten it is insoluble in water, glycerine, or alcohol, but

is readily soluble in vegetable oils, such as sweet oil, almond, or olive oils. It is better always to use it weakened in olive oil. If lint is saturated in it, and applied to recent wounds—such as saddle sores in horses, or when the skin is bruised about the legs—it first takes away all the pain, and causes the wound rapidly to heal, and at the same time prevents flies from being troublesome. When sheep are fly-blown, it acts as a perfect charm, not only at once instantaneously destroying the maggots, but allaying the pain so much, that the terror-stricken sheep will in joy peacefully sleep, after its application.

NEW WORK ON SURGERY.—We are informed that a translation into English of Professors Peuch and Toussaint's recently published and excellent work on Veterinary Surgical Anatomy and Surgery (*Précis de Chirurgie Vétérinaire*), is now being made with the authors' permission, and under Toussaint's direction. The very favourable reception accorded to this work on the Continent, and the fact that we have no treatise on the subject in our language, leads us to anticipate a hearty welcome to it in England.

Obituary.

THE Military Secretary, India Office, reports the following deaths among veterinary officers of the Indian army :—

Mr. R. Burgess Parry,	Bengal ;	graduated	July 1, 1824.
„ F. Rogers	„	„	July 30, 1827.
„ L. M. Rogers,	Bombay	„	Feb. 21, 1828.

The decease of the following members of the profession is likewise reported by the Secretary of the Royal College of Veterinary Surgeons :—

Mr. Wm. Ward, of Crediton, Devon,	who graduated in	1862.
„ Geo. Yeomans, London	„	1847.
„ Geo. Holms, late of Norton Malton	„	1867.
„ David Campbell, late of Dundee	„	1834.
„ Matth. Glennie, Campmuir, Perthshire	„	1843.

Professor Tabourin, of the Lyons Veterinary School, has died at Algiers, of a disease which had affected him for many years, and which not long ago compelled him to retire from teaching. Tabourin was one of the most esteemed and competent of French veterinary professors, and his method of instruction won the approval of the authorities—combining, as it did, oral and practical teaching. He appears to have kept well in advance of recent scientific investigation, as is testified by a remarkable series of articles in the *Recueil de Médecine Vétérinaire*, published since his retirement, and written in support of Pasteur's views with regard to germs and the non-spontaneity of contagious diseases. He was the author of the "Nouveau Traité de Matière Médicale, de Thérapeutique et de Pharmacie Vétérinaires," the third edition of which, in two large volumes, was published three years ago. According to the desire expressed before death, his remains were brought to France, and interred near the school in which he had laboured so earnestly and successfully for nearly the whole of his life.

Army Veterinary Department.

Gazette, May 24.

ROYAL ARTILLERY.—Veterinary-Surg. G. Aitken resigns his commission.

Gazette, June 11.

VETERINARY DEPARTMENT.—John William Akerman Morgan, Gent., to be Veterinary Surgeon.

Correspondence, etc.

EAGLEY MILK-POISONING CASES.

To the Editor of the VETERINARY JOURNAL.

SIR,—Messrs. Robinson, Medical Officers of Health for Turton, in your impression for April, have seen fit to bring before your readers a matter that would certainly have redounded more to their credit had it, and the part they took in it, been allowed to rest; and much as we owe to the medical profession and desirous as we are to remain upon the most friendly and amicable terms with them, it is not possible, with due respect to ourselves, to allow, not "disparaging remarks," but "perverted facts," made by individual members of that profession, to go by without being refuted. We have no ambition to be raised to the pinnacle of fame referred to by Messrs. Robinson, but desire the ungarnished facts to be placed before our profession, who will then have an opportunity of drawing their own conclusions as to the true state of affairs.

On February 8th, 1876, we, the undersigned, at the request of the chairman of the Turton Local Board, made a careful examination of the cow said to be diseased, the milk from which, it was reported, had produced the epidemic. Up to the time of our arrival, the cases undoubtedly were believed to be caused by some acid constituent of the milk acting upon the solder of the milk can. This assertion was made by Dr. Robinson, sen., in our presence, and after we had finished our examination of the cow in question. Dr. Robinson still maintained that his own opinion was the correct one—in proof of which he pointed out a small deposition in the cans, of what he himself designates lactate of lead; and perhaps Dr. Robinson, if his memory proves as faithful in this as it appears to do in some other matters, will remember the remark being made at the time, that it would require the entire can dissolving to produce poison enough to account for the wide-spread epidemic then existing. It is therefore patent "that the fertile and imaginative brain of some over-zealous reporter" (to which Dr. Robinson attributes this "theory") strangely coincides with the views he then expressed to us.

Messrs. Robinson's report, in which they state everything favourable to the theory of the milk producing the disease, is upset, and our opinion confirmed, by the fact that Mr. Molyneux, V.S., drank a quantity of milk in the presence of Dr. Robinson, and continued to drink it daily; also feeding dogs upon *it* alone. Mr. Kershaw, jun., also partook freely of it daily, without the *slightest ill effects*, as proved by the accompanying certificates. Now, we maintain that science is good when borne out by facts; but when its theories are in antagonism to facts, it is apt to bring science into ridicule. How is it that Dr. Robinson saw such well-marked gradations and peculiar symptoms in

his cases, depending upon the quantity of this milk drunk by them, whilst several people partook of a much larger quantity with impunity?

There was no misunderstanding the remark made by Dr. Robinson, who distinctly stated and re-stated, in the hearing of us all, "That the cow had not given any milk until then, although she had been calved six weeks." The facts, as proved by the certificate of Mr. Kershaw, jun., are as follows: The cow had been calved about six weeks, and gave eight quarts of milk night and morning, which was mixed with the milk of the other cows regularly, and sold, up to the night we were there, to any one who would purchase it—the sale not being officially prohibited, as stated by Dr. Robinson, on the 5th. We at once wrote to the chairman to the following effect: That although the mik from this particular cow was not the cause of the epidemic, yet it was evident that the poison of the epidemic was conveyed through the medium of the milk from this farm, and urgently advised the prohibition of its sale without a moment's delay. This was acted upon by the chairman at once, and was the first official order interdicting its sale received by Mrs. Kershaw.

THOMAS GREAVES, F.R.C.V.S.
THOMAS TAYLOR, F.R.C.V.S.
SAMUEL LOCKE, M.R.C.V.S.

"Little Oak, Turton.

"I hereby certify that I attended Mrs. Kershaw, Hardman's Farm, Eagley (the owner of the cow said to be diseased), and that she died of Typhoid Fever, which, in my opinion, was caused by the foul water used on her farm, and not by the milk; as she distinctly told me before her death that she had not taken milk at any time for some years previous. About that time, I attended several cases of Typhoid Fever in Turton, none of which could possibly be caused by the milk from Mr. Kershaw's farm, but were clearly attributable to water which was absolutely unfit for domestic use.

"ALEX. COSGRAVE, M.R.C.S. Eng."

"Veterinary Establishment, St. George's Road, Vernon Street,
"Bolton, May 15, 1878.

"I hereby certify that I attended the cow the property of the late Mrs. Kershaw, Eagley, said to be diseased and giving milk unfit for human food. I considered the milk to be good and quite fit for human food, from the time of calving; and as a proof of this, I partook of the milk myself, in the presence of Dr. Robinson and his son, and afterwards daily, without the slightest ill effect on my health. I also fed daily and wholly a number of dogs with the milk, without its producing the slightest effect upon their health.

"N. MOLYNEUX, M.R.C.V.S."

"Tower View, Turton, May 17, 1878.

"I hereby certify that I was ordered by the Chairman of the Turton Local Board to be in attendance upon the veterinary surgeons, and give them every assistance in their investigation of all matters relating to the Eagley milk-poisoning case; and after their investigation they drew up a letter and a report. The former I gave to the Chairman at once; it was signed by Thos. Taylor, Thos. Greaves, and S. Locke, and strongly advised that the sale of the milk should be stopped immediately. The Chairman, acting upon this, prohibited the sale of milk from the farm that very night. This was the first and only official notice that had been given to Mrs. Kershaw.

"JAMES HOYLE, *Surveyor and Inspector of Nuisances.*"

"Astley Bridge, near Bolton, May 15, 1878.

I hereby certify that I milked the cow said to have been diseased, from the time of her calving to the time when the milk was prohibited from being sold. She gave eight quarts per meal during this time, and I partook of it daily, it being mixed with the other cows' milk from the time of her calving up to its prohibition, and my health was not in the slightest degree injured by it.

"HENRY KERSHAW, Son of Mrs. Kershaw, owner of the cow."

VETERINARY TEACHERS AND STUDENTS.

To the Editor of the VETERINARY JOURNAL.

SIR,—I look forward every year with much pleasure to the annual meeting of the Royal College of Veterinary Surgeons; for though I am compelled to travel a very long distance in order to be present, yet I am amply repaid for the toil, loss of time, and expense—not to say anything of the inconvenience—in the gratification I experience from meeting so many friends, and learning what is being done in the way of improving our profession. I look upon it as something in the nature of a duty to be present on such occasions, and I am only sorry to observe every year that many of those members who do not reside so far from Red Lion Square as I do, are conspicuous by their absence. The annual dinner I also never miss, as it is perhaps the most pleasant part of the day's business, and I often hear, in the after-dinner speeches, something which is not elicited or alluded to at the midday meeting. Some of the allusions in these speeches are oftentimes instructive, at times they are amusing, and now and again they are startling, if not astounding. To the last category must be allotted, I think, the remarks made on May 6th by the Principal of the Royal Veterinary College and his successor *in embryo*, Professor Pritchard, to the effect that the teachers were now doing too much for the students in the way of teaching, and that the latter should be left more to their own resources. Indeed, the Principal alluded, with something like a pang of regret, to the good old times when men who could scarcely speak, read, or write their own language, and who knew nothing whatever of animals, could be tinkered into veterinary surgeons by listening to a few lectures during something less than half a year's attendance at college. I attended the London School about a score of years ago, and I can truthfully assert that the teachers did not attempt to spoil us by too much attention. We rarely, indeed, saw operations performed—we certainly never performed any, nor yet were we instructed how to perform the most trifling operation, administer medicine, or use our hands and eyes; and it is scarcely too much to say that the instruction was a farce—so far as training young men for the practice of a most difficult profession is concerned. At that time—and it is probably the same now—the School appeared to be a kind of Joint Stock Company, instituted for the benefit of subscribers and certain veterinary surgeons, their servants, who designated themselves "Professors." We rarely received lectures from the Principal, who was generally either trying to make a fortune on the turf, doing private practice, or figuring in the witness-box—perhaps hundreds of miles away, when he ought to have been in the class-room. As for clinical instruction, there was none; and the other teachers, when they had concluded their lecture for the day, considered they had done enough for the unfortunate students. If the latter were not in possession of some practical knowledge before they went to college, they certainly had it not when

they graduated; and if they were at all acquainted with the theoretical portion of their profession, they were indebted for this to books—assuredly not to their teachers. This state of affairs will account for the painful failure the great majority of the graduates made when they had the temerity to embark in practice. They did not possess either general or technical knowledge; consequently, they were utterly incompetent to represent the profession, or to compete with the cowleech or farrier. How must it have been in earlier times?

I am informed, by recent graduates, that things are still far from what they should be, and that the students are left pretty much to themselves in the matter of professional education. They see no practice at the College: subscribers' animals are the only patients admitted, and of course they are not allowed to be used for instructional purposes; operations are generally performed when the students are not present; the lectures on pathology are too few, and the notions on which they are based antiquated in the extreme; clinical instruction is almost mythical, and many of the subjects advertised as taught are never alluded to; one of these is that most important subject, farriery, which is carried out in the College forge on "improved principles,"—*i.e.* the free use of knife and rasp, and consequent mutilation of the hoofs. Some of the teachers are pluralists, holding more than one office; and after they have delivered their lecture, they are no more seen in the College, but hurriedly depart to their other employments. Many most important maladies are never mentioned in the lectures; no student, I believe, ever sees a cow, sheep, dog, or other animal except the ass dissected, though the anatomy of these is one of the subjects they are now examined upon for their diploma. Consequently, students have to resort to books for the knowledge they should receive from their teachers, if ever they are to graduate.

The fact is, sir, that veterinary teaching has been far more of a pecuniary than a scientific object—just as the College has been founded and conducted more for the benefit of subscribers than for the advancement of veterinary science. For this reason, the School has no reputation in Europe; it has never produced a teacher of any merit, or whose name was known as that of a scientist, nor will it ever produce any until things are placed on a very different footing. Instead of the students being over-taught, they are very much under-taught, as the Royal College examinations show, and as every student will confess; and instead of being left more to their own resources—which means idleness for teachers and students—they require much more attention, and the inculcation of that enthusiasm for their profession which has hitherto been denied them, in the absence of both precept and example.

I trust, sir, that we shall hear no more of students being too much attended to by their teachers. Some of the latter may lament the supplanting of the crude paltry teaching of a few years ago by something more compatible with the demands of modern days; but they must move with the times, or give place to others who are not fossilized in their notions, and are willing to do their duty to the students.

At our next year's gathering, I hope we shall hear nothing of this retrograde nonsense from those who should know better, and who should give proof that they at least understand something of the duties and functions of a teacher of veterinary science.

I am, sir,

Yours very obediently,

"A Provincial Practitioner."

THE *LEPTUS AUTUMNALIS* AS AN ANIMAL PARASITE.

To the Editor of the VETERINARY JOURNAL.

DEAR SIR,—I am tempted to supplement your remarks on the "Harvest Bug" by one or two additional facts. By referring to my "Farmers' Veterinary Adviser," p. 279, you will see that you are in error in supposing that this subject has not been noticed in English veterinary literature. The "Adviser" was published in May 1876, thus antedating Professor Friedberger's observations on the *Leptus* as a canine parasite.

Thirty years ago, when living in East Lothian, I was myself a yearly victim of the *Leptus;* and, boy as I was, noticed that man was not the only object of its ravages, but that the domestic animals, and especially the horse, suffered severely around the nose and mouth when turned to pasture or fed on fresh grass in the stable.

In a manuscript which I prepared many years ago for a work on "Veterinary Medicine," I have the following remarks :—

"*Genus Leptus* (λεπτον, a mite), *Harvest Bug.*—Under this head we must mention two species, so small as to be all but invisible, and natives respectively of Europe and America.

"*Leptus Autumnalis,* the bright scarlet harvest bug of many parts of Europe, has its home in the surface mould of gardens and fields and the foliage of growing plants in autumn only. It burrows in the skin of the legs and other parts of the body of man, and by preference under garters, suspenders, and other tight parts of the clothes ; *and in the nose and face of horses.* It gives rise to intolerable itching, with the eruption of rounded swellings a line or more in diameter, in the midst of which may often be seen a bright scarlet point, indicating the position of the mite, which may then be extracted with a needle. It only lives two or three days in the skin, so that if the sufferer can keep clear of fresh foliage for this length of time a spontaneous recovery will be effected.

"*Leptus Americanus* is less easily seen, being of a dull brick-red colour. It abounds in some of the Western and Southern States, where it is known as the *Jigger,* being confounded with the dangerous burrowing flea (*chigoe*) of the West Indies and Central America. It burrows in the skin of the human leg, and in that of animals—especially dogs and mice—causing intolerable itching and eruption. The wearing of high boots is usually resorted to as a precautionary measure."

That both species burrow under the epidermis there can be no doubt, as I have frequently picked them out from the papules with a needle ; but that they establish a permanent *habitat* in the integument, and there increase and multiply, is a mistake. I have never seen the irritation of the skin persist more than three or four days after the man or animal had been secluded from the haunts of the parasite. This, then, may be held to indicate the limit of their viability in the skin ; and in cases where the eruption and itching have continued for weeks and months, it is because new colonies of *Lepti* have been continuously received. In this respect they are the counterparts of the *Ixodes.*

Again, they are not, as you suppose, confined to the chalky soils. In East Lothian they abounded in different localities on the *old red sandstone,* and on *granite* formations ; in Devon they are found on the *red sandstone,* and in our western prairies on the *drift.*

In Scotland the *Leptus* is rarely seen before the end of July, and it disappears with the first slight evening frosts in September.

Yours, etc.,

Cornell University, Ithaca, N.Y.,
May 12th, 1878.

JAMES LAW, F.R.C.V.S.

[In Professor Law's "Veterinary Adviser," the reference to the Harvest Bug certainly escaped my notice, probably because of its brevity. He writes at page 279: "Among acari occasionally parasitic may be mentioned: the *dermanyssus* (misnamed hen-louse), the *gamasus* of musty hay, and the *leptus* (misnamed jigger in the Western States),—all excepting the last living on the surface, and easily discovered." I, however, now acknowledge my indebtedness to Professor Law for the additional information he affords in the above communication.—*G. F.*]

ANSWERS TO CORRESPONDENTS.

JOHN HAMMOND.—The examinations for the diploma of the Royal College of Veterinary Surgeons take place in London, Edinburgh, and Glasgow. Candidates must have studied for a certain number of terms at one of the recognised Veterinary Schools, one of which is in London, two in Edinburgh, and one in Glasgow. The examination embraces a large number of subjects pertaining to veterinary science.

TO CONTRIBUTORS.

WE cannot undertake to publish, as ORIGINAL COMMUNICATIONS, papers which are intended to appear simultaneously in other journals. The reason for this course is obvious, and in adopting it we are only conforming to the rule observed in all high-class publications.

Communications, Books, Journals, etc., Received.

COMMUNICATIONS have been received from T. Greaves, Manchester; J. W. Hill, Wolverhampton; R. S. Laws, Toulouse; T. Taylor, Manchester; S. Locke, Manchester; D. Hutcheon, Liverpool; T. Law, Cornell University, Ithaca, U.S.A; "A Country Practitioner;" Professor Walley, Edinburgh; Professor McFadyean, Edinburgh; T. Hopkin, Manchester; W. H. Coates, London; A. G. Rolls, Arundel; J. Rowe, London; Professor Toussaint, Toulouse Veterinary College.

BOOKS: *Finlay Dun*, Veterinary Medicines: their Actions and Uses; *G. J. Whyte-Melville*, Riding Recollections; *J. L. Notter*, The Chemical Theory of Contagium; *E. Thierry*, Devoirs et Droits des Vétérinaires.

JOURNALS: *Recueil de Méd. Vétérinaire; Revue Vétérinaire; Der Thierarzt; Archives Vétérinaire; Wochenschrift für Thierheilkunde und Viehzucht; Journal of the Royal Agricultural Society of England; North British Agriculturist; Farmer; Mark Lane Express; Agricultural Gazette; Repertorium der Thierheilkunde; Annales de Méd. Vétérinaire; Lancet; Practitioner; Journal de Méd. Vétérinaire et de Zoötechnie; American Veterinary Review; Live Stock Journal; Journal of the Victoria Agricultural Society; Medical Press and Circular.*

NEWSPAPERS: *Home Chronicle; Cork Constitution; Eastern Morning News* (two copies); *Daily Telegraph; Aldershot Military Gazette; Glasgow Courier.*

All Communications, Books for Review, Advertisements, etc., must be addressed to the Publisher, 20, King William Street, Strand, W.C.

Morbid Specimens are to be forwarded addressed to the Editor, "Veterinary Journal" Brown Institution, Wandsworth Road, London.

Communications must be accompanied by the name of the writer, whether he may desire to have it published or not. Anonymous letters and articles cannot be inserted. The Editor does not hold himself identified with the views or opinions expressed by Contributors. Communications for insertion in the next number must arrive on or before the 15th of the present month.

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